

GRAVE CREEK RANGE

(Petty Creek)

(Hunting District 203)



Description: The Grave Creek Range (Hunting District 203) lies directly west of Missoula and contains approximately 419 square miles. The Lolo National Forest administers the majority (about 65%) of the hunting district, and both The Nature Conservancy (TNC) and Plum Creek Timber Company (PCT) own approximately 10% each. The quality and quantity of winter range forage here is declining. Grasslands are subject to weed infestations and conifer encroachment, and shrubfields that were created by the wildfires in the early 1900s are decadent and degraded by conifer reproduction.

Approximately 30 square miles (7%) of the hunting district are occupied by bighorn sheep during some portion of the year. Eighty percent of the occupied range is on public lands. The bighorn sheep population is commonly referred to as the “Petty Creek herd,” because its range is limited mostly to suitable habitats in the Petty Creek drainage.

Public Access: Hunting opportunities include motorized hunting on the periphery and walk-in hunting in the interior of this herd’s range. There is ample access to the majority of the unit, especially since TNC and PCT allow

public access on their lands. Although access to public land is still good, private acquisition and development of former PCT lands has reduced public access during the last 10 years.

Bighorn Sheep Populations: In 1968, FWP established this population with a release of 16 bighorns from the Sun River in Petty Creek. In 1985, four adult rams captured on the National Bison Range were released in Petty Creek. Between 1978 and 1983, senior thesis students at the University of Montana, Len Kopec and Gary Fralick conducted the first field investigations of this herd, describing seasonal movements, habitat conditions, and basic demographics. The first helicopter survey was conducted in 1984, when 63 sheep were counted. That same year, the first hunting season (two either-sex licenses) was established.

The number of bighorn sheep counted during helicopter surveys in Hunting District 203 has ranged from 63 (1984) to 151 (2007) (Figure 1 and Table 1). A previous peak of 149 bighorns was counted in 1993. The 1996-97 winter was so severe that the population declined to below 100 counted sheep. In spite of greatly reduced harvests, numbers remained low and exhibited poor lamb production until 2003.

Recruitment is often 40 to 50 lambs: 100 ewes, recorded during early April surveys. But: during the years immediately following the 1996-97 winter, only 20 to 30 lambs: 100 ewes were observed. The number of rams (yearlings, sub-adults, and adults) typically is 65-90% of ewes counted during surveys. Adult rams (>3/4-curl) numbered 31 in April 2007 (Table 1).

Recreation Provided: Hunting of bighorn sheep was initiated in the fall of 1984 with the

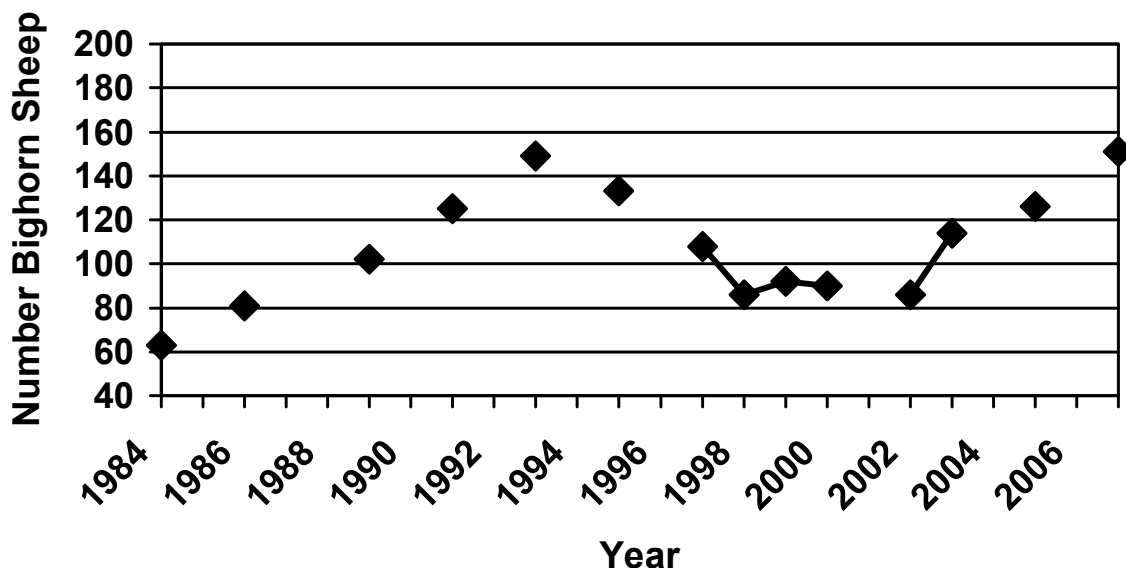


Figure 1.
Total number of bighorn sheep observed during aerial trend surveys in the Grave Creek Range population, Hunting District 203, 1984-2007.

Table 1. Spring helicopter surveys of bighorn sheep in Hunting District 203, 1984-2007.

Year	Ewes	Lambs	Yrlg Rams	Subad Rams	Adult Rams	Unclass	Total
1984	21	10	8	8	10	6	63
1986	37	28	8	5	3	0	81
1989	45	21	11	8	20	0	105
1991	49	22	8	16	25	5	125
1993	66	26	5	18	34	0	149
1995	56	33	7	9	28	0	133
1997	45	9	2	24	28	0	108
1998	38	14	2	10	22	0	86
1999	44	14	4	9	21	0	92
2000	43	19	6	7	15	0	90
2002	41	18	6	6	15	0	86
2003	53	22	11	10	18	0	114
2005	63	19	4	15	25	0	126
2007	31	12	7	12	31	58	151

issuance of two either-sex licenses. The first adult ewe permits were issued in 1988. As the population increased, the number of licenses was increased. Many of the bighorn sheep are nonmigratory and use habitats near the Petty Creek Road. Consequently, sheep are a locally popular wildlife viewing opportunity.

Current Annual Bighorn Sheep Harvest:

Since the initial 1984 season, permitted harvests have risen and fallen in response to changing numbers of sheep (Table 2). Since 1990, limited-entry harvests have been prescribed to maintain a population of 120 to 150 counted bighorns. By 1993, five either-sex and 10 adult ewe permits were issued in an attempt to curb further population growth. However, when the 1996-97 winter reduced the herd, permits and harvests were greatly reduced to allow recovery. By 2007, after counting historically high numbers of sheep, FWP again issued five either-sex and 10 adult ewe licenses. During most years, 100% of the licenses are filled. Hunters typically harvest one or more Boone and Crockett-size rams each year.

Accomplishments: This population of bighorn sheep is well established in all suitable habitats and appears to be sustainable at 100 to 150 counted sheep. Linkage with other populations is unknown, but it is generally believed that genetic interchange with other populations is limited or non-existent. Nevertheless, young rams and/or ewes occasionally are seen outside of Petty Creek, near Alberton, in Lolo Creek, in Albert Creek and in Fish Creek, indicative that surplus animals are migrating in search of new habitats or other bighorn populations.

The Lolo National Forest, with funding from the Foundation for North American Wild Sheep, has done some prescribed burning and weed treatment of bighorn winter range in Petty Creek.

In 2008 and 2009, TNC purchased 39,423 acres within the hunting district from PCT as part of the Montana Legacy Project. These lands include a large percentage of occupied bighorn sheep habitat in Petty Creek. TNC's land management goals include preserving vital wildlife habitat, as well as conserving traditional access for hunting.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. Rural subdivisions in the Petty Creek area have resulted in numerous small bands of livestock, including domestic sheep and goats. In 1996, with the owner's permission, FWP exterminated a small band of feral Barbary sheep and young bighorn rams in Lolo Creek. In 2001, FWP for the first time recommended covenants restricting occupancy by domestic sheep on proposed subdivisions in Petty Creek. To date, Missoula County has adopted such covenants in three subdivisions, but enforcement is typically left to homeowners.
- 2) Human development on winter range areas and on migratory routes is common in this area. Salting for bighorns is common and leads to degradation of nearby forage plants and potentially increases the risk of disease transmission. A proposal to pave

Year	Number Either-Sex Licenses	Ram Harvest	Number Ewe Licenses	Ewe Harvest
1984	2	2	-	-
1985	2	2	-	-
1986	2	2	-	-
1987	2	2	-	-
1988	2	2	5	5
1989	2	2	5	5
1990	2	2	5	5
1991	2	2	5	5
1992	2	2	5	3
1993	5	5	10	9
1994	5	5	10	9
1995	5	5	10	8
1996	5	5	10	9
1997	5	5	2	2
1998	5	5	2	2
1999	5	5	2	0
2000	2	2	2	2
2001	2	2	2	2
2002	2	2	2	2
2003	2	2	2	1
2004	2	2	2	2
2005	3	3	5	5
2006	3	3	5	5
2007	5	(5)	10	(10)

Table 2.
Number and
types of licenses
issued and
subsequent
harvest,
Hunting District
203, 1984-2007.

the Petty Creek Road likely will lead to not only road-kill losses, but also to more rural subdivisions and habitat loss in the area.

they are also separated by major highways and rivers.

- 3) Weed infestations and conifer encroachment are degrading forage production on summer and winter ranges.
- 4) Illegal ATV use is common in the area. This activity potentially displaces sheep from preferred habitats, contributes to weed infestations, and aggravates nonmotorized sportsmen using the area.
- 5) Sale of PCT land parcels has reduced hunter access to important sheep habitats. Although TNC purchased some of those lands, additional sales and subsequent rural developments would further diminish public access and habitat quality.
- 6) Genetic isolation of this herd is probable, because no other sheep populations occur close to Petty Creek. Not only are other populations distant from Petty Creek, but

Population Monitoring: This bighorn population is surveyed biennially from a helicopter. Surveys are conducted over the entire winter/spring range in April, during spring green-up. Bighorns are counted and classified by age and sex. Based on horn development, rams are assigned to yearling, sub-adult (1/2 to 3/4-curl), or adult (greater than 3/4-curl) classifications. To monitor trends in lungworm loads in this population, pellet groups are collected in several locations every few years and sent to the Veterinary Research Laboratory at Montana State University in Bozeman.

Summary of Public Comment

Public comments related to the bighorn sheep population and its management in this hunting district indicates a high level of support for the current season structure. Both hunters and non-hunters enjoy seeing bighorn sheep in this area.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams at current numbers. Cooperate with public land management agencies and private individuals in the management of bighorn habitats. Maintain good opportunity for bighorn sheep hunters to harvest sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain approximately 20,000 acres of occupied bighorn sheep habitat for the benefit of bighorns, other wildlife species, and other agency mandated uses.
2. Encourage improvement of habitat conditions on publicly owned winter ranges (primarily USFS) so that vegetation conditions on these winter ranges provide adequate forage for bighorns and other wildlife during the winter period.
3. Encourage maintenance and improvement of habitat conditions on public lands (USFS) so that bighorns continue to utilize these lands during summer and fall rather than moving onto private lands.
4. Prevent over-utilization of forage by limiting the population to less than 140, through public hunting and the capture and removal of sheep.

Habitat Management Strategies

- 1) Continue to cooperate with the USFS on prescribed burning and weed treatment projects to make sheep habitats more productive.
- 2) Work with the USFS to limit motorized use and access of the area to minimize displacement of sheep from preferred habitats and to limit weed infestations on the range.
- 3) Continue to work with private landowners and Missoula County to limit the use of domestic sheep and goats in the area.

Game Damage Strategies

Specific game damage problems have not occurred to date and are not anticipated. Bighorn numbers can be managed through

public hunting and trapping and removal as they approach or exceed objectives.

Access Strategies

Based on the current distribution of bighorns during the hunting season, lack of hunter access to these sheep has not been a significant issue. FWP must continue to work with the USFS to protect access to public lands. Additionally, FWP may be able to work with private landowners to preserve access for hunters to sheep habitats. Where sheep use private land during the hunting season, landowners either personally allow hunter access or are enrolled in FWP's Block Management Program.

Population Objectives

- 1) Maintain the number of bighorn sheep observed during post-winter aerial surveys within 10% of 130 sheep (117 to 143).
- 2) Maintain a ram: 100 ewe ratio observed during post-season aerial surveys of at least 60 rams: 100 ewes with at least 30% of the rams having a $\frac{3}{4}$ -curl.

Population Management Strategies

Bighorn numbers are currently being managed primarily through ewe harvest, a modest harvest of the ram segment, and natural mortality. Another option for managing this population is the use of these sheep as transplant stock for initiating or augmenting other populations. To prevent genetic isolation, limited transplants from other populations might be helpful, particularly during population lows. The population objective of 130 ($\pm 10\%$) observed bighorn sheep was derived from these considerations: 1) the ability of public lands to provide forage for the wintering bighorn population, and 2) the understanding that catastrophic disease-caused die-offs, exhibited in many other sheep populations, are often density dependent occurrences.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through limited-entry harvest of the female segment. In Hunting District 203, licenses are issued under the following prescriptions (Table 3):

Standard Regulation: A limited number of adult ewe licenses issued would be up to 20% of the number of ewes going into the fall season.

NORTHWEST MONTANE	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	$\pm 10\%$ of 130	Greater than 35	5 or more adult ewe licenses	Up to 20% of Ewes
Restrictive Regulation	More than 10% below 130	Less than 35	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	Greater than 10% above 130	Greater than 35	5 or more adult ewe licenses OR translocate if > 25 sheep including rams are available	More than 20% of Ewes

Table 3. Summary of Regulation types under different population criteria for ewe harvest and population management.

The number of ewes going into the fall season would be based on the number of ewes observed during the biennial survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is within 10% of the population objective and lamb recruitment is above 35 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 10% below the population objective and lamb recruitment is less than 35 lambs: 100 ewes,

OR if available, the Petty Creek herd might be augmented by a transplant of ewes and young rams from another range.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to

20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the biennial survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is greater than 10% above the population objective and lamb recruitment is greater than 35 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 20% of the $\frac{3}{4}$ -curl rams in the population.

The Standard Regulation will be recommended if: The population is within objective (+ 10% of 130), there are 50 to 100 rams: 100 ewes, and 30% of the rams are at least $\frac{3}{4}$ -curl (Table 4).

NORTHWEST MONTANE	Number of Either-Sex or Legal Ram Licenses Is	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of Rams with $\geq \frac{3}{4}$ -curl
Standard Regulation	Up to 20% of the $\frac{3}{4}$ -curl rams	$\pm 10\%$ of 130	50-100	≥ 30
Restrictive Regulation	Up to 10% of the $\frac{3}{4}$ -curl rams	More than 10% below 130	< 50	< 30
Liberal Regulation	More than 20% of the $\frac{3}{4}$ -curl rams	Greater than 10% above 130	> 100	≥ 30

Table 4. Summary of potential ram harvest under different population parameters and criteria.

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the $\frac{3}{4}$ -curl rams in the population.

The Restrictive Regulation will be recommended if: The population is more than 10% below the population objective of 130, there are less than 50 rams: 100 ewes and less than 40 lambs: 100 ewes and less than 30% of the rams are at least $\frac{3}{4}$ -curl.

Liberal Regulation: Limited-entry through issuing either-sex licenses with the number of either-sex licenses issued being more than 20% of the $\frac{3}{4}$ -curl rams in the population.

The Liberal Regulation will be recommended if: The population is more than 10% above the objective of 130, there are more than 100 rams: 100 ewes, and more than 30% of the rams are at least $\frac{3}{4}$ -curl.

JOHN LONG RANGE

(Lower Rock Creek)
(Hunting District 210)



Description: The Lower Rock Creek bighorn herd is located approximately 20 miles southeast of Missoula in the foothills above the lower reaches of Rock Creek and its tributaries. A satellite herd has become established in the Bearmouth area; this herd is not currently hunted. Both the Lower Rock Creek and Bearmouth herd are stable in size and distribution.

The 188mi² bighorn sheep Hunting District 210 is 78% U.S. Forest Service (USFS) – Lolo and Beaverhead-Deerlodge National Forests (NF), 20% private, 1% Bureau of Land Management (BLM), and 1% Department of Natural Resources and Conservation (DNRC). The predominant land manager, in both occupied and unoccupied sheep habitat within the district, is the USFS, mostly the Lolo NF. Hunting District 210 is bounded by Interstate 90 to the north, Harvey Creek to the east, Ranch Creek to the south, and the Sapphire Divide to the west. Lower Rock Creek (Hunting District 210) is a third smaller than Upper Rock Creek (Hunting District 216) and has a correspondingly smaller bighorn sheep herd.

Bighorn sheep occupy 37% of the district (45,001 acres; 70mi²) during some part of the year. Summer/fall habitat makes up 21%

(25,293 acres; 39mi²) of the total hunting district, with an additional 16% (19,708 acres; 31mi²) used year-round, including during the critical winter period. Of the occupied habitat, 71%, totaling 50mi², is managed by the Lolo NF (none of the occupied habitat is managed by the Beaverhead-Deerlodge NF), 24% by private landowners, 3% by the DNRC, and 2% by BLM. The majority of occupied general and winter habitat is on or near Babcock Mountain, Spring and Brewster Creeks, and along the bottom of the valley. The Lolo NF and private landowners own the key lands for sheep in Lower Rock Creek.

The Rock Creek herd winters on grassy faces above Spring and Brewster Creeks and on Babcock Mountain, with rams also using the ridge north of Gilbert Creek. Late fall and spring are spent on these areas as well as on the valley bottom. Lambing occurs on rocky cliffs above Rock Creek and Spring Creek. In the summer, rams and some ewe groups move upslope several miles, while other ewe groups remain on pastures and in subdivisions along Rock Creek.

The Bearmouth herd is located in the south-central Garnet Range between Wallace Creek and Little Bear Creek north of Interstate 90. The core of their range, Dry and Cramer Creeks, is 10 miles upstream of the confluence of the Clark Fork River and Rock Creek. They use about 10,500 acres (J. Kolbe, pers. comm.) of corporate timberland (60%), private property (25%), and DNRC lands (15%).

The Bearmouth and Rock Creek herds have a well-documented interchange of individuals, and presumably genes. Connectivity with the Upper Rock Creek herd is known. Given the wide ranging explorations of rams in particular, and exploratory movements of bighorn in general, it is plausible to consider a regional metapopulation composed of both Rock Creek and Bearmouth herds (Hunting Districts 210 and 216), Lower Blackfoot (Hunting District 283), Skalkaho (Hunting District 261), the East Fork (Hunting District 270) and West Fork (Hunting District 250) of the Bitterroot, Lost Creek (Hunting District 213), and Garrison (Hunting District 212). Grave Creek Range (Hunting District 203) is isolated due to the separation imposed by the Missoula metropolitan area, Interstate 90 and U.S. Highway 93, and the Clark Fork River. While movements of individuals between distant populations (e.g., Garrison to the West Fork) are not likely on an annual basis (or ever), genetic exchange across generations is likely between neighboring herds and possible between distant herds.

Public Access: There is good public access to the Lower Rock Creek herd. Bighorn habitat occurs on Lolo NF lands, accessible from Forest Service roads, or on private lands in the valley that are visible from Rock Creek Road. The Lolo NF maintains a public viewing area specifically for bighorn. Hunting access on the valley bottom is generally unavailable, but hunting is not appropriate in this densely populated and subdivided landscape anyway. The primary threat to accessing the herd for observation or hunting would be if public access to national forest right-of-ways were curtailed. Given the high profile of this herd and frequent use of public lands by recreational users, this is unlikely.

Bighorn Sheep Populations: The Lower Rock Creek bighorn herd is a reintroduced herd founded by the translocation of 25 sheep (five yearling rams, 16 ewes, and four male lambs) from Wildhorse Island in 1979 to Babcock Mountain and Spring Creek. An additional transplant in 1987 of 28 (18 ewes, seven lambs, three rams) sheep from the Lost Creek herd to Ranch Creek helped to further establish the herd. The Wildhorse and Lost Creek herds were both established, in part, by transplants from the Sun River herd, and as a result, Lower Rock Creek bighorns are descendents of Rocky Mountain Front bighorns.

Berwick (1968) and others (Aderhold 1972; FWP 1975) noted that evidence suggests that bighorns were abundant throughout the Rock Creek drainage prior to extensive settlement and exploitation of the area. After the discovery of silver deposits in Granite County in 1864, market hunting, competition with domestic livestock, and possibly disease-related die-offs resulted in near extirpation of the species from

the drainage, as well as the loss of bighorns from the Flint Creek Valley. In 1905, only five bighorns were observed on winter ranges, and these were in Upper Rock Creek. Thereafter, bighorn sheep were absent from Lower Rock Creek until the transplant in 1979.

The population grew from the initial transplant to 44 in 1983 and to a peak of 268 observed bighorn in 1996 (Figure 1 and Table 1). Concerned about the impact of a large population on range and herd health, managers moved aggressively to reduce the population in 1997. In total, 75 sheep were removed, with 50 (35 ewes, five lambs, and 10 rams) for transplants and 10 rams and 15 ewes harvested by hunters. The population did not climb to over 200 individuals again until 2008 when 201 bighorns were observed during an aerial survey.

Lamb production has been moderate with a mean of 36 lambs: 100 ewes and a range of 19 to 65 lambs: 100 ewes observed in the last 25 years (Table 1). Ram to ewe ratios have been widely variable (mean 79, range 19 to 131), more likely due to sampling error than a result of varying harvest. Ram groups can be difficult to find in Hunting District 210, and the loss of a single group can result in 25 fewer rams observed. License levels have not been as variable as the total number of rams observed. For example, from 1995 to 2002, 10 either-sex licenses were issued each year, yet total rams observed varied from 16 to 87 (Table 2).

Several rams were observed in the Bearmouth area beginning in the early 1980s, following the 1979 transplant of bighorn sheep into nearby Lower Rock Creek. In 1987, one radio-collared ewe from the Rock Creek transplant moved north across the Clark Fork River and established a home range in the Garnet Mountains between Wallace Creek and

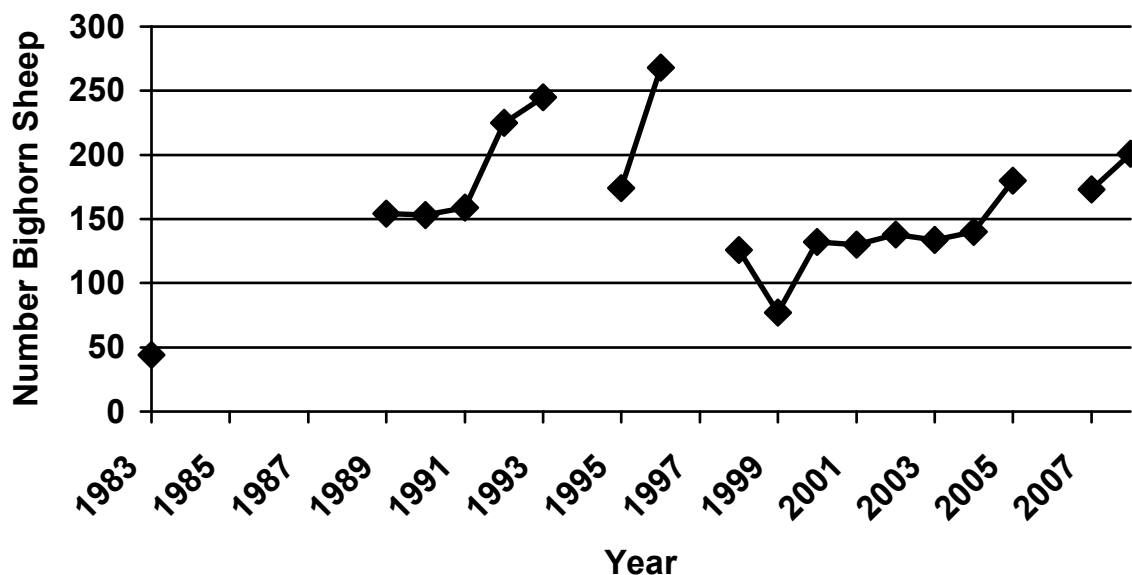


Figure 1. Total number of bighorn sheep observed during aerial trend surveys in the Lower Rock Creek population, Hunting District 210, 1983-2008.

Table 1.
Classification
data from
surveys of
bighorn sheep
in lower Rock
Creek, Hunting
District 210,
1983-2008.

Year	Month	Method	Rams		Ewes and Lambs			Total		Rams/ 100 Ewes	Lambs/ 100 Ewes
			3/4+	Total	Ewes	Lambs	Total	Uncl	Sheep		
1983	March	Copter	2	13	20	11	31	0	44	65	55
1989	April	Copter	14	34	100	19	119	1	154	34	19
1990	April	Copter	18	58	54	30	84	0	142	107	56
1990	June	Copter	16	42	80	31	121	0	153	53	39
1991	April	Copter	9+	53	85	21	106	0	159	62	25
1992	March	Copter	40	52	91	40	131	42	225	57	44
1993	April	Copter	29	91	94	30	124	30	245	97	32
1995	May	Copter	58	84	64	11	75	0	174	131	17
1996	April	Citabria	---	66+	---	---	---	202	268	---	---
1998	March	Copter	64	87	33	6	39	0	126	---	20
1998	April	Citibria	---	82	48-	---	48-	0	130	170	---
1999	March	Copter	26	28	40	9	49	0	77	70	22
2000	April	Copter	36	48	61	23	84	0	132	79	38
2001	June	Ground	0	16	83	31	114	0	130	19	37
2002	May	Copter	34	48	69	21	90	0	138	70	30
2003	April	Copter	22	40	65	29	94	0	134	62	45
2004	April	Ground	19	29	48	31	79	32	140	60	65
2005	April	Copter	41	73	84	23	107	0	180	87	27
2007	March	Copter	8	63	33	10	43	67	173	---	30
2008	April	Copter	28+	73	64	28	92	36	201	114	44

Van Curan Gulch. Sightings of this collared ewe and other sheep continued until reports of 12 to 15 sheep became common.

DeCesare (2002) began a graduate research project on this herd in 2001 and estimated that the Bearmouth herd consisted of at least 17 individuals. Regular movements of Bearmouth rams to and from Rock Creek were documented, and several rams from Rock Creek appeared in Bearmouth during the course of the study. Reliable sightings of up to 28 individuals have been reported as recently as 2007, but FWP does not regularly monitor this herd.

Bighorn sheep have been removed for transplant from Lower Rock Creek twice. In 1997, 50 bighorn were captured, with 30 released on the main Boulder River in FWP Region 5 and 20 in the Tendoy in Region 3. In 2007, 15 bighorns (13 ewes and two yearling rams) were captured by net-gunning and transported to and released along the Green River in Utah to supplement a prior introduction. Translocation has been an effective population management tool.

Recreation Provided: The Lower Rock Creek herd provides hunting and wildlife viewing

opportunities. During 2007, hunters spent 20 days pursuing rams and seven days hunting ewes in Hunting District 210. From 2004 to 2007, an average of 38 days a year were spent by ram hunters in Hunting District 210. While 38 days is not many, most hunters consider their time spent hunting and watching wild sheep to be some of the most treasured days of their lives. The odds of drawing a ram license in Montana are slim, and in 2007 the chance of drawing in Hunting District 210 was on par with statewide odds at less than 1%. Similar numbers of hunters put in for nearby districts: Hunting District 203 (463 applicants), Hunting District 210 (481 applicants), and Hunting District 216 (474 applicants). The Lower Rock Creek herd is very visible to residents and recreational users and provides a watchable wildlife population close to Missoula. The Bearmouth herd is not currently hunted, but its proximity to Interstate 90 allows for easy viewing opportunities.

Current Annual Bighorn Sheep Harvest:

The first hunting season in Hunting District 210 was in 1986, when a 3.5-year-old ram was harvested. License numbers for rams have ranged from one to 10. In total, 128 adult rams

Date	Method	No. of Ram/ES Licenses	No. of Rams Killed	No. of Ewe Licenses	No. of Ewes Killed	Other Ewes	Other Lambs	Other Rams	Release Area
1986	Hunting	1	1	0	0				
1987	Hunting	2	2	0	0				
1988	Hunting	2	2	0	0				
1989	Hunting	2	2	9	8				
1990	Hunting	5	5	15	12				
1991	Hunting	5	5	15	13				
1992	Hunting	7	7	30	27				
1993	Hunting	3	3	30	27				
1994	Hunting	5	5	30	24				
1995	Hunting	10	10	15	12				
1996	Hunting	10	8	30	24				
Feb 1997	Trap/Transplant					20	0	5	Boulder River
Feb 1997	Trap & Transplant					15		5	Tendoy's
Feb 1997	Trap						5		WA State Univ
1997	Hunting	10	10	15	12				
1998	Hunting	10	10	1	1				
1999	Hunting	10	10	0	0				
2000	Hunting	10	9	0	0				
2001	Hunting	10	10	0	0				
2002	Hunting	10	10	0	0				
2003	Hunting	4	3	0	0				
2004	Hunting	4	4	0	0				
2005	Hunting	4	4	0	0				
2006	Hunting	4	4	8	8				
2007	Trap & Transplant					13		2	Green River, UT
2007	Hunting	4	4	10	6				

Table 2.
Bighorn sheep removals in Lower Rock Creek, Hunting District 210, Region 2 of Montana Fish, Wildlife & Parks, 1986-2008.

have been harvested from this population and 12 yearling rams removed for transplants since 1986 (Table 2). Ewe licenses have ranged from zero to 30 with 174 ewes harvested and 48 transplanted. For the 2008 hunting season, there were 10 either-sex licenses and one ewe license available by special drawing.

The mean age of rams harvested in Hunting District 210 from 1990 to 2007 is 6.5 years (range 2.5 to 11.5 years). The highest mean age of rams taken in was 9.5 years in 2003. Although license numbers were reduced after 2003, the mean age of harvested rams has since declined (2004: 8, 2005: 6, 2006: 7, 2007: 8). More than 28 rams with a $\frac{3}{4}$ -curl or better were observed during the 2008 aerial survey. Many of these rams were full-curl, and we expect that the mean age of harvested rams in 2008 will remain above the long-term average.

In 2002, the FWP Commission asked Region 2 to consider shortening the sheep season because of a perception that too many older rams were being taken in the rut close to Rock Creek Road. This was a controversial issue, hunters were overwhelmingly against this proposal and the season was left in place with fewer permits available in 2003.

Accomplishments: The Lower Rock Creek sheep herd is an example of a successful reintroduction of bighorn sheep to their native habitat. After a 75-year absence, the herd was reestablished in 1979. Transplants also resulted in the unintentional establishment of the Bearmouth population. Close cooperation between state and federal agencies, private industry and landowners, and sportsmen resulted in two successful introductions. A

program of active habitat management by the USFS, Lolo NF in cooperation with FWP has resulted in grassland enhancement, via slashing and burning, on thousands of acres of core habitat since 1986. Individuals from Rock Creek have been used to establish herds elsewhere.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. A large domestic sheep herd is pastured directly adjacent to the core of the Bearmouth herd's range; domestics and bighorns regularly intermingle throughout the year. Juxtaposition of this herd to domestic sheep is the primary threat to the Bearmouth herd's long-term survival. Similarly, the frequency of interchange with the nearby Rock Creek herd extends this threat to Upper and Lower Rock Creek.
- 2) Weed management throughout the two herds' range is ongoing and important to continue. Efforts to enhance and maintain grassland foothills habitat using integrated weed management and prescribed burning will benefit bighorns.
- 3) Lower Rock Creek is highly developed and becoming more so. Numerous issues arise because of the proximity of the herd to human developments. Road-kill, harassment and injury of sheep by domestic dogs, and complaints by landowners about bighorn sheep damage to their lawns and fields will continue to present a management challenge.

Population Monitoring: The Lower Rock Creek bighorn herd has been surveyed via ground and air since its establishment. Citizen participation in population counts and herd monitoring has provided supplemental data and engendered public support for the herd. Bighorns are counted and classified by age and sex, with rams classified based on horn development as Class I, II, III, or IV (Geist 1971).

Summary of Public Comment

Outfitters, ranchers, hunters, wildlife watchers, and the general public all have an interest in Rock Creek bighorn sheep. Numerous trophy rams taken in the drainage have helped Rock Creek to become one of the best-known sheep herds in Montana. License levels for Rock Creek bighorns are watched closely, with a correspondingly high level of

public input. Conflicts between hunters and private landowners and between bighorns and homeowners are a frequent source of concern. Constituents pay close attention to this herd and management actions within Rock Creek.

Management Goal

Manage for a healthy and productive bighorn sheep population with a goal of producing trophy class rams. Maintain and enhance bighorn sheep habitat on a landscape scale. Coordinate closely with the Lolo NF, the BLM and private landowners to control weeds, enhance grassland communities, and minimize the risk of contact with domestic sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain over 70mi² (45,001 acres) of occupied bighorn sheep habitat for the benefit of bighorns and other wildlife species.
- 2) Encourage public and private landowners to manage their properties to maximize the quality and quantity of forage on native grasslands. Explore options to cost-share habitat improvements like weed control, prescribed burning, and, where appropriate, removal of conifers from grasslands.
- 3) Prevent over-utilization of forage on winter range by limiting the population through public hunting and the capture and removal of sheep.

Habitat Management Strategies

- 1) Work with private landowners and state, federal, and county governments to limit the use of domestic sheep and goats in the area. Coordinate with the Missoula and Granite County Weed Boards, Montana State University Agricultural Extension, Montana Stock Growers Association, the BLM, and the USFS to minimize impacts to bighorns and maximize improvements to sheep range.
- 2) Work with private landowners; state, federal, and county governments; and conservation organizations including Five Valleys Land Trust, the Foundation for North American Wild Sheep, the Rocky Mountain Elk Foundation, Safari Club International, and others to conserve important bighorn habitat on private lands through the use of conservation easements or fee title acquisition.

3. Work with landowners to identify and accomplish habitat improvements on important bighorn sheep habitats. Also, it is important to ensure that projects developed to benefit bighorns do in fact have positive results.

Game Damage Strategies

As Lower Rock Creek has been subdivided, complaints about bighorn damage to alfalfa fields have shifted to complaints about sheep impacts to lawns. Public hunting access is not realistic or safe on many of these properties.

Access Strategies

Maintain and enhance existing public access to state and federal lands. Pursue strategic purchases to ensure continued access to public and private lands in bighorn habitats.

Population Objectives

- 1)Maintain the number of bighorn sheep observed during spring aerial surveys within 20% of 200 sheep (160 to 240).
- 2)Maintain a ram: ewe ratio observed during spring aerial surveys of 40 rams: 100 ewes with at least 50% of the rams as Class III and IV (approximately ¾-curl or greater).

Population Management Strategies

The Hunting District 210 population objective of 200 (± 20%) observed bighorn sheep is based on: 1) available forage on winter ranges, 2) maintaining range quality, 3) knowledge that catastrophic disease-related die-offs can be density dependent, and 4) minimizing conflicts with private landowners. Population management is occurring through hunter harvest of ewes and rams, natural mortality, and removal of sheep for translocation to other locales.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through natural mortality, limited-entry harvest of ewes, and, when appropriate, removal of animals for translocation. Ewe bighorn sheep licenses in Hunting District 210 will be issued under the following prescriptions (Table 3):

Standard Regulation: A limited number of adult ewe licenses issued would be up to 15% of the number of ewes going into the fall season. A rough estimate of the number of ewes in the fall will be derived from the number of ewes observed during the annual survey, assuming a 5% mortality of adults, and addind recruitment of one-half the previous year’s lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is between 160 and 240 and lamb recruitment is over 30 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is less than 160 and lamb recruitment is less than 30 lambs: 100 ewes.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the annual survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year’s lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	160-240	Over 30	Limited Entry Adult Ewes	Up to 15% of Ewes
Restrictive Regulation	Less than 160	Less than 30	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	Over 240	Over 40	Limited Entry Ewes OR translocate	Up to 20% of Ewes

Table 3. Summary of regulation types under different population criteria for ewe harvest and population management.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 240 and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 15% of the Class III and IV rams in the population.

The Standard Regulation will be recommended if: The population is within 20% of objective (160 to 240), there are 40 to 60 rams: 100 ewes, and over 50% of the rams are Class III and IV (Table 4).

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the Class III and IV rams in the population.

The Restrictive Regulation will be recommended if: The population is below 160 bighorns, there are less than 40 rams: 100 ewes, and less than 50% of the rams are Class III and IV.

Liberal Regulation: Limited-entry either-sex licenses with the number of licenses issued being up to 20% of the Class III and IV rams in the population.

The Liberal Regulation will be recommended if: The population is over 240 bighorns; there are more than 60 rams: 100 ewes, and more than 50% of the rams are Class III and IV.

GARRISON (Hunting District 212)



Description: The Garrison herd occupies bighorn sheep Hunting District 212 and is named after the town of Garrison, which lies a mile east of the herd's range. Although the hunting district includes much of the northern portion of the Flint Creek Range, the core range for this herd is centered on private lands two miles southwest of the junction of U.S. Highway 12 and Interstate 90. The hunting district is made up of approximately 304mi² of private, state, and federally owned lands. Most of the district, 173mi² (57%), is privately owned. Government agencies manage the rest with the Beaverhead-Deerlodge National Forest managing 102mi² (34%), Montana Department of Natural Resources and Conservation (DNRC) (11mi²), the Bureau of Land Management (BLM) (8mi²), the Montana State Prison (8mi²), and the National Park Service (2 mi²). The district is bounded by MT Highway 1 to the west and Interstate 90 to the north and east; to the south it crosses the Flint Creek Range along a roughly east to west line from Deer Lodge to Philipsburg.

Table 4.
Summary
of potential
ram harvest
under different
population
scenarios.

MOUNTAIN-FOOTHILLS	Number of Ram Licenses	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of rams Class III & IV
Standard Regulation	Up to 15% of Class III & IV rams	160-240	40-60	> 50
Restrictive Regulation Prescription 2	Up to 10% of Class III & IV rams	<160	< 40	< 50
Liberal Regulation	Up to 20% of Class III & IV rams	>240	> 60	> 50

Bighorn sheep occupy about a third, 62mi², of this area in the northeastern corner of the district and in the northern end of the Flint Creek Range. The herd is atypical because their primary range is on a small island, 3,840 acres, of privately owned foothills habitat. This core range is separated from U.S. Forest Service– managed mountainous habitat by three miles of open intermountain grasslands and gradual benches that descend from the Flint

Creek Range north toward the Clark Fork River. Residents of Gold Creek have reported a small band of bighorns living near Warm Springs Creek in deer/elk Hunting District 291, eight miles northwest of Garrison. Although this satellite herd has not been verified by FWP employees, recovery of the skull of an 11-year-old ram nearby demonstrates that rams have been exploring habitats north of Interstate 90 in the Garnet Range.

While some ram groups and a few ewes utilize high-elevation habitats in the mountains, the bulk of the population lives year-round on about 6mi² of intermountain grasslands, dry Douglas fir forests, and cliffs above the Clark Fork River. Winter range and lambing habitat are entirely within this area. Additional information is needed on habitats used by ram bands in the summer and fall. Radio-marked rams have been found 18 miles to the west near Boulder Creek (above the town of Maxville), and rams and ewes have been sighted 16 miles to the southwest at Powell Mine. These sightings demonstrate that bighorns are making long exploratory movements into the Flint Creek Range.

Public Access: Hunting access in the Garrison herd's primary range is very limited. With the exception of a section of DNRC property, which is under consideration for land banking (sale to a private party), all of the 3,840 acres are privately owned by four private landowners. It has been challenging to get hunters onto these private lands, and without better access it will be difficult to provide hunting opportunities or manage bighorn populations. Public access to Forest Service land in the North Flints is excellent, but the sheep are few and scattered over a 100mi² landscape.

Bighorn Sheep Populations: The Garrison herd was established by bighorn sheep colonizing new habitat and presumably originated from the Lost Creek herd (25 miles to the south). The first report of bighorns at Garrison was in the early 1980s when Lyn Nielson, FWP biologist, sighted one ram, one ewe, and one lamb. Ultimately, the herd grew to occupy the northeast foothills of the Flint Creek Range. The first comprehensive population surveys were conducted when Nick DeCesare's masters research ("Movement and Resource Selection of Recolonizing Bighorn Sheep in Western Montana," University of Montana, 2002) was initiated.

DeCesare radio-marked seven ewes and one ram from the Garrison population and conducted surveys documenting herd size, composition, and location. In 2001, DeCesare counted a total of 55 bighorn sheep in the population; in 2002, he counted 74 bighorns (Figure 1 and Table 1). Ninety-four bighorns were observed during an aerial survey conducted by FWP in 2004 and 118 during a ground-based survey in 2005.

Total observed bighorn sheep increased from 2001 to 2005, but decreased in 2006 and 2008. We suspect that this reduction is a byproduct of aerial surveys rather than a sign of a population decline. Aerial surveys for this herd have been relatively ineffective because the sheep run into the cliffs and timber prior to observation or classification. As a result, lamb: ewe and ram: ewe ratios are not available for 2004, 2006, or 2008.

Ground-based surveys show a population with good lamb production and half as many rams as ewes. The ram: ewe ratios are likely biased low due to the fact that some ram bands migrate into the Flints for summer and fall. Hunting pressure on this herd has been light,

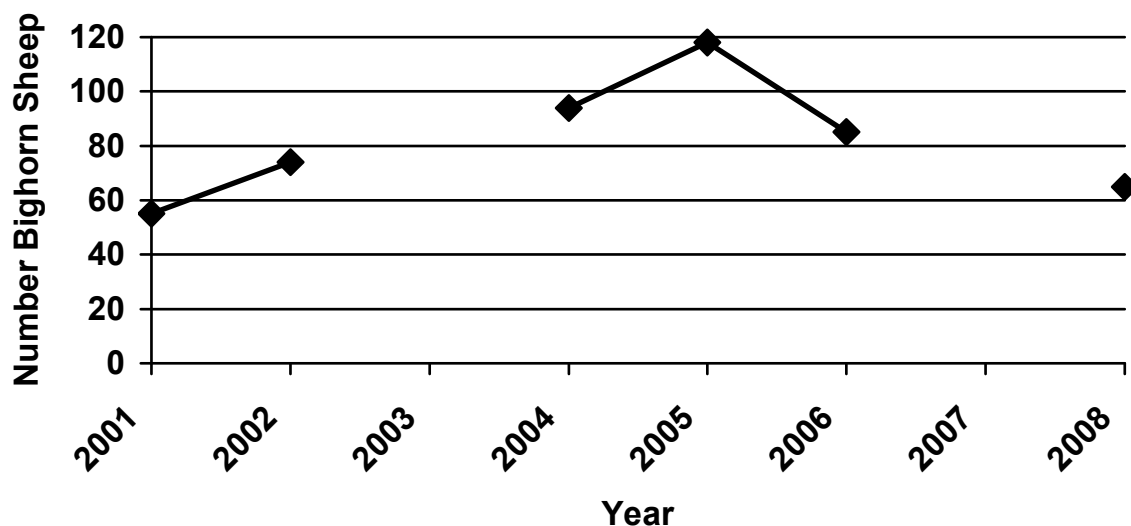


Figure 1. Total number of bighorn sheep observed during aerial trend surveys in the Garrison population, Hunting District 212, 2001-2008.

Table 1.
Counts and
classifications
from ground
and aerial
surveys for
the Garrison
population,
Hunting District
212, 2001-2008.

Date	Total	Ewes	Lambs	Unc	Rams						Per 100 ewes	
					I	II	III	IV	Unc	Tot	Lambs	Rams
Sept. 2001	55	27	12	0	-	-	-	-	16	16	44	59
Aug. 2002	74	34	20	-	-	-	-	-	20	20	59	59
Apr. 25, 2004 ¹	94	3	2	51	-	1	2	1	34	38	-	-
Aug. 8, 2005	118	55	33	-	-	-	-	-	30	30	60	55
Mar. 23, 2006 ¹	85	8	4	45	2	4	3	1	18	28	-	-
Apr. 30, 2008 ¹	65	44	12	-	2	1	2	1	3	9	-	-

¹Aerial bighorn surveys

with only four rams harvested since the season was opened in 2004. This herd has the potential to grow and disperse widely from the Garrison area into the Flints to the south or Garnets to the north.

No bighorns have been removed from this population for translocation. The proximity of this herd to the interstate highway and difficulty obtaining hunting access make it a candidate for future capture and removal operations.

Recreation Provided: Because the sheep mostly occupy private lands and a hunting season has only been in place for four years, the Garrison herd is not well known. The most hunters to put in for this district were 110 in 2004. Despite difficulty obtaining access, all four hunters were able to harvest a ram. From 2004 to 2007, hunters have spent 32 days (average eight, range one to 23) pursuing bighorn rams in Hunting District 212.

Current Annual Bighorn Sheep Harvest: Bighorn sheep Hunting District 212 opened in 2004, and one either-sex permit has been available every year since. Hunter success harvesting a ram has been 100%, and all rams harvested have exceeded a 185-point Boone and Crockett score. Harvested rams have been at least 8.5 years old with the oldest being 11.5 years old.

Accomplishments: The Garrison herd is an example of a naturally colonizing bighorn sheep population. FWP has been successful in monitoring this population and initiating a hunting season.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. The increasing use of domestic sheep to manage

weeds, the “sheep on wheels” program, is of concern to bighorn managers. In the Deer Lodge Valley, the use of domestic sheep for weed control is on the upsurge, with thousands of domestic sheep brought into the valley annually. The program is active on private lands, and proposals to use domestic sheep for weed control on public lands are under review. Domestic sheep are found five miles to the north of the Garrison herd and within two miles of the reported satellite herd.

- 2) The development of a large, high-end subdivision directly adjacent to the Garrison herd presents numerous problems including potential stress to wintering and lambing sheep, loss of landscape connectivity, game damage complaints, direct and indirect losses of habitat, and further limits to public access. FWP is committed to working with adjoining landowners to minimize adverse impacts. The department has been successful in directing placement of a 5,695-acre conservation easement adjacent to and within the herd’s core habitat.
- 3) Weed management throughout the herd’s range is necessary. Efforts to enhance and maintain grassland foothills habitat will benefit bighorns.

Population Monitoring: The Garrison herd has been surveyed using a super-cub airplane or helicopter, in March or April, and using a systematic ground-based survey in the summer. Depending on available funding and time, these methods can be used interchangeably in the future. Bighorns are counted and classified by age and sex, with rams classified based on horn development as Class I, II, III, or IV.

Summary of Public Comment

Public awareness of and comment on management of the Garrison herd is limited.

Hunters and local residents appreciate this population. There is concern among sportsmen that private landowners are precluding a more generous hunting season.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams. There is an opportunity for an increase in sheep numbers and distribution on public lands in adjoining mountain ranges. Cooperation with neighboring private landholders is especially important to minimize impacts to habitat, minimize the risk of contact with domestic sheep, and maximize opportunities for bighorn sheep hunters to harvest sheep and for FWP to manage the population.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain over 62mi² square miles (39,680 acres) of occupied bighorn sheep habitat for the benefit of bighorns and other wildlife species. Conserve landscape integrity and connectivity by precluding subdivision of critical habitats.
- 2) Encourage private landowners to manage their properties to maximize the quality and quantity of forage on native grasslands. Explore options to cost-share habitat improvements like weed control, prescribed burning, and where appropriate, removal of conifers from grasslands.
- 3) Prevent over-utilization of forage on core range by limiting the population, when necessary, through public hunting and the capture and removal of sheep.

Habitat Management Strategies

- 1) Work with private landowners and state, federal, and county governments to limit the use of domestic sheep and goats in the area. Coordination with the Powell County Weed Board, Montana State University Agricultural Extension Service, Montana Wool Growers Association, and the Montana Stock Growers Association is necessary to minimize impacts to bighorns.
- 2) Work with landowners to identify and accomplish habitat improvements on important bighorn habitats.
- 3) Continue to work with private landowners; state, federal, and county governments;

and conservation organizations including Five Valleys Land Trust, The Foundation for North American Wild Sheep, the Rocky Mountain Elk Foundation, Safari Club International, and others to conserve important bighorn habitat on private lands through the use of conservation easements or fee title acquisition.

Game Damage Strategies

In the past, there have not been any game damage complaints related to the Garrison herd. We anticipate that with the construction of a golf course and large development adjacent to and within the herd's range, game damage complaints may occur. If so, department response will be consistent with FWP's program direction including the requirement of reasonable hunting access to the herd. Capture and removal operations may be appropriate to reduce herd numbers if necessary.

Access Strategies

Maintain and enhance existing public access to state and federal lands. Work with private landowners with holdings within the core range to assure reasonable and adequate hunting access to the Garrison herd. Maintain FWP access to complete surveys, disease and range monitoring, and capture operations.

Population Objectives

- 1) Maintain the number of bighorn sheep observed during spring aerial surveys within 20% of 125 bighorn sheep (100 to 150);
- 2) Maintain a ram: ewe ratio observed during spring aerial surveys of at least 40 rams: 100 ewes with at least 40% of the rams as Class III and IV (approximately ¾-curl or greater).

Population Management Strategies

The population objective of 125 ($\pm 20\%$) observed bighorn sheep is based on 1) the limited size of currently utilized core range, 2) limited access to the population, and 3) our understanding that catastrophic disease-caused die-offs are often density dependent. If the Garrison herd were to substantially expand their range, via satellite herds or other expansion, a higher population objective would be appropriate.

Currently, population management is occurring through natural mortality. Harvest of one ram a year has not had an impact on population size. As the herd grows, ewe harvest

or removal of bighorns via transplant may be necessary. Access is critical to manage the Garrison herd and to allow hunter opportunity. All prescriptions for harvest management (below) are predicated on sufficient access to accommodate the prescribed harvest.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through natural mortality and, if feasible, limited-entry harvest of ewes. Adequate access and landowner acceptance is necessary to implement ewe harvest in Hunting District 212. If access is available, bighorn sheep licenses in Hunting District 212 will be issued under the following prescriptions (Table 2):

Standard Regulation: A limited number of adult ewe licenses issued would be up to 15% of the number of ewes going into the fall season. An estimate of the number of ewes in the fall will be derived from the number of ewes observed during the annual survey, assuming a 5% mortality of adults, and adding a recruitment of one-half the previous year’s lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is between 100 and 150 and lamb recruitment is over 30 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is less than 100 and lamb recruitment is less than 30 lambs: 100 ewes.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall

season. The number of ewes going into the fall season would be based on the number of ewes observed during the annual survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year’s lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 150 and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 15% of the Class III and IV rams in the population (approximately ¾-curl and greater).

The Standard Regulation will be recommended if: The population is within 20% of objective (100 to150), there are 40 to 60 rams: 100 ewes, and over 40% of the rams are Class III and IV (Table 3).

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the Class III and IV rams in the population.

The Restrictive Regulation will be recommended if: The population is below 100 bighorns, there are less than 40 rams: 100 ewes, and less than 40% of the rams are Class III and IV.

Liberal Regulation: Limited-entry either-sex licenses with the number of licenses issued being more than 20% of the Class III and IV rams in the population.

The Liberal Regulation will be recommended if: The population is over 150 bighorns; there are more than 60 rams: 100 ewes, and more than 40% of the rams are Class III and IV.

Table 2.
Summary of regulation types under different population criteria for ewe harvest and population management.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	100-150	Over 30	Limited Entry Adult Ewes	Up to 15% of Ewes
Restrictive Regulation	Less than 100	Less than 30	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	Over 150	Over 40	Limited Entry Ewes OR translocate	Up to 20% of Ewes

MOUNTAIN-FOOTHILLS	Number of Ram Licenses	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of rams Class III & IV
Standard Regulation	Up to 15% of Class III & IV rams	100-150	40-60	> 40
Restrictive Regulation	Up to 10% of Class III & IV rams	<100	< 40	< 40
Liberal Regulation	Up to 20% of Class III & IV rams	>150	> 60	> 40

Table 3. Summary of potential ram harvest under different population scenarios.

LOST CREEK (Hunting District 213)



Description: The Lost Creek bighorn herd resides immediately west of Anaconda and as a result is often referred to as the “Anaconda herd.” Occupied habitat includes foothills in the Flint Creek Range near Lost Creek, valley bottom winter range in Anaconda’s West Valley, and high alpine ridges and cirques in the Anaconda-Pintler Range. The herd has rebounded from a pneumonia-induced die-off in 1991 and is increasing in size and distribution. In 2002, Hunting District 213 was expanded south of MT Highway 1 to reflect the herd’s increased use of Garrity Mountain and the Anaconda-Pintler Mountains.

Ownership of the approximately 411mi² Hunting District 213 is 55% private, 39% federal (Beaverhead-Deerlodge National Forest [NF]), and 6% state (mostly FWP and Montana Department of Natural Resources and Conservation [DNRC]). District boundaries include privately owned lands that are not sheep habitat. The district is defined by the East Fork of Rock Creek to the west, the Continental Divide to the south, Interstate 90 to the east, and Racetrack Creek to the north.

A third of the district (133mi²), is used by bighorns and most of the sheep habitat is in public ownership. Fifty-four percent of all occupied habitat, totaling 71mi², is managed by the Beaverhead-Deerlodge NF. Occupied general and winter core habitat is centered on Stucky Ridge, which runs northwest of Anaconda toward Olsen Mountain, parallel to Lost Creek to the north and MT Highway 1 to the south. This core habitat makes up 11% (46mi²) of the entire district, with another 21% (87mi²) occupied seasonally. The majority (63%, 29mi²) of year-round habitat is in public ownership

with 6,572 acres of bighorn habitat owned by FWP. The Blue-eyed Nellie, Garrity Mountain, and Lost Creek Wildlife Management Areas (WMA) provide important habitat for Anaconda-area bighorn sheep.

The topography and vegetation in the area are well suited to bighorns. Native grasslands are found on the foothills, ridges, and saddles, abundant cliffs and rocky terrain provide escape cover, and high-elevation habitats provide nutritious forage in the summer. In the winter, bighorns concentrate in the West Valley between Olsen Gulch and Blue-eyed Nellie Gulch and in Lost Creek near Timber Gulch. The Blue-eyed Nellie and Garrity Mountain WMAs offer critical winter range. Lambing occurs throughout the primary range of the Lost Creek herd and is concentrated on lower elevations. Traditional summer range is at the heads of Lost, Olsen, Foster, and Warm Springs Creeks.

Bighorn are expanding their summer range and can be found along the Continental Divide 9 miles south of Stucky Ridge. Bands of sheep are frequently reported in mountain goat habitat above Lake of the Isles, in Nelson Basin, and near Miller Lake. Rams have been observed over 20 miles southwest of Stucky Ridge, near Cougar Creek, at the headwaters of the Rock Creek drainage. Anaconda rams have been pioneering westward, and rams from Upper Rock Creek have been exploring north.

Pioneering sheep from the Lost Creek herd were the likely founders of the Garrison herd. Population connectivity throughout the Upper Clark Fork between the Lost Creek, Garrison, and Upper and Lower Rock Creek herds is possible.

Public Access: There is excellent public access to the Lost Creek herd. Abundant public lands, close proximity to Anaconda and MT Highway 1, and numerous Forest Service roads allow the public to observe and hunt bighorn with ease. Anaconda bighorn habitat and public access have benefited from numerous land transactions that have brought private lands into public ownership. The U.S. Forest Service (USFS) completed the 14,000-acre Lost Creek exchange in 1994. The Garrity Mountain WMA, at 9,200

acres, was purchased from RY Timber in 2000 using funds from the Natural Resource Damage program, and the 23,300-acre USFS “Watershed Property” was purchased in 2001. The 162-acre Blue-eyed Nellie WMA protects critical winter range in Anaconda’s West Valley and provides access to Blue-eyed Nellie and Tin Can Gulches.

Bighorn Sheep Populations: The Lost Creek herd was established in 1967, with help from the Anaconda Sportsmen’s Club, when 25 bighorn sheep (20 ewes, five rams) were transplanted to Olsen and Foster Creeks from the Sun River herd near Choteau, Montana. The transplant was successful; the population grew to 50 in 1971 and to 80 in 1974. Two bighorns from Thompson Falls supplemented the population in 1985. The herd grew rapidly, and by 1989 the bighorn population was over 361 sheep (Figure 1 and Table 1). Over 150 sheep (mostly ewes and lambs) were captured and removed for transplant within Montana during a five-year period, 1986 to 1991, yet the population continued to grow.

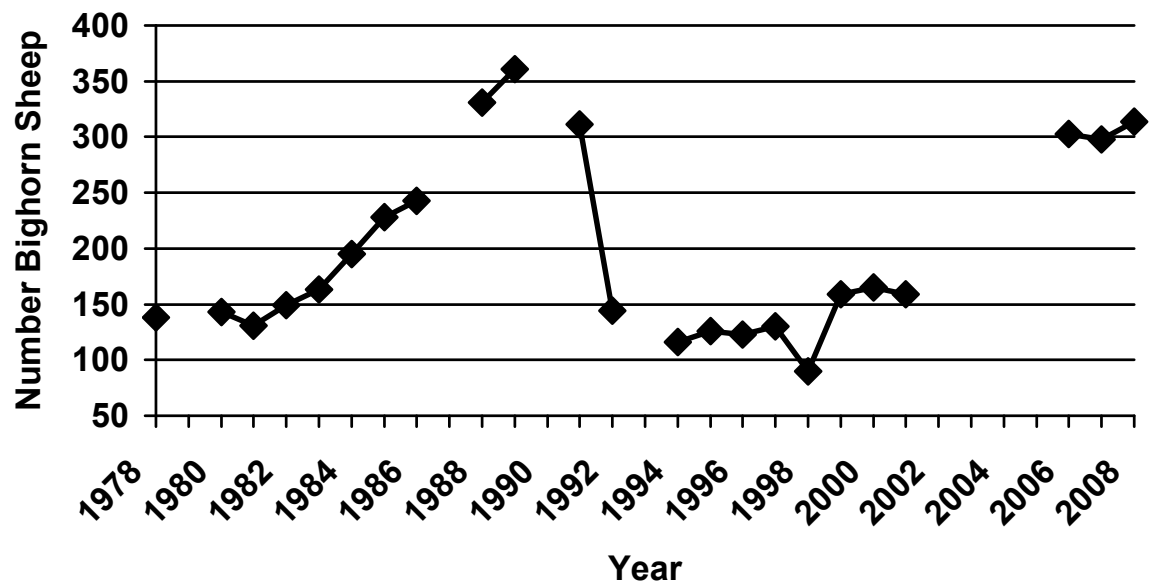
On September 15, 1991, a hunter in Lost Creek found a sick ram. The ram died in transit to Anaconda and was taken to the State Veterinary Lab in Bozeman for an autopsy, which determined that pneumonia was the cause of death. Subsequently, dead and sick sheep were found throughout the range of the herd, and lung samples from 19 bighorns were submitted to the lab on September 9, 1991. *Pasteurella hemolytica* was cultured and determined to be the major cause of the die-off. The disease outbreak lasted for about 10 weeks and the population plummeted. Only 80 head were observed during a partial aerial survey on December 12, 1991, and 144 sheep were

observed during a full survey in 1992. Mortality from the die-off was over 50%. Total observed sheep numbers continued to decline until 1999. Since 2000, the population has grown steadily, and the herd is now over 300 head. Lamb production in the Lost Creek herd from 1978 to 2008 has been consistently strong (mean = 45, range = 13 to 73). Only in 1994, three years after the die-off, was a lamb: ewe ratio of less than 30 lambs: 100 ewes observed. The capture and removal of large numbers of ewes in the late 1980s resulted in more rams in the population than ewes. Ram to ewe ratios have varied from 44 to 112 rams: 100 ewes. Class III and IV rams made up more than half of the ram population every year except 1978. Rapid horn growth and large numbers of older rams characterize this population.

As the Lost Creek herd increased in the late 1980s, an aggressive transplant program was initiated to reduce the population and develop bighorn herds in other areas. In total, over 160 bighorns were captured for transplant using a drive net at Blue-eyed Nellie and Smith Gulches in February 1986, 1988, and 1991. Records are incomplete, but it is known that in 1991 alone, 60 sheep were captured and relocated with about half going to the Boulder area and the rest released near Quake Lake. These captures were composed mostly of ewes and lambs and resulted in a sex ratio biased toward males. Transplants from the Lost Creek herd ceased in 1991 after the die-off. The Lost Creek herd has rebounded and should again be considered as a source for transplants.

Recreation Provided: Good public access and consistently large rams have made the Lost Creek herd popular with sportsmen. In

Figure 1. Total number of bighorn sheep observed during aerial trend surveys in the Lost Creek population, Hunting District 213, 1978-2008.



Year	Rams (degree of horn curl)			Ewes and Lambs			Uncl.	Total Sheep	Rams/ 100 Ewes	Lambs/ 100 Ewes
	3/4+	1/4-1/2	Total	Ewes	Lambs	Total				
1978	12	35	47	45	33	78		138	104	73
1980	27	15	42	70	31	101	----	143	60	44
1981	34	7	41	67	23	90	----	131	61	34
1982	22	27	49	73	27	100	----	149	67	37
1983	32	38	70	62	31	93	----	163	112	50
1984	58	30	88	3	0	107	----	195	----	----
1985	65	34	99	90	39	129	----	228	110	43
1986	59	47	106	101	36	137	----	243	105	36
1988	55	68	123	150	58	208	----	331	104	39
1989	90	59	149	147	65	212	----	361	101	44
1991	97	64	161	64	32	106	44	311	----	50
1992	23	21	44	72	28	100	----	144	44	39
1994	42	12	54	55	7	62	----	116	87	13
1995	45	4	49	6	3	43	34	126	----	----
1996	49	0	49	24	11	35	39	123	----	46
1997	41	4	45	51	18	69	16	130	88	35
1998	16	4	20	48	22	70	----	90	42	46
1999	43	10	53	53	31	84	22	159	100	58
2000	38	23	61	38	22	60	44	165	----	58
2001	41	21	62	64	33	97	----	159	97	53
2006	32	33	72	125	53	178	53	303	58	42
2007	31	33	80	56	8	64	153	298	----	----
2008	39	28	70	62	39	101	143	314	----	62

Table 1.
Classification
data from aerial
surveys for
the Lost Creek
population,
Hunting District
213, 1978-2008.

2007, Hunting District 213 was the seventh most popular district to put in for a ram license statewide, with 1,186 hunters applying for a license. Hunters spent 102 days hunting bighorn rams and 46 days hunting ewes in Hunting District 213 during 2007. The herd's proximity to Anaconda and ease of observation from MT Highway 1, North Cable Road, and the Blue-eyed Nellie WMA make it an important watchable wildlife opportunity. Local residents frequently drive out to observe the sheep.

Current Annual Bighorn Sheep Harvest:

Eight either-sex and 20 ewe licenses were available by special drawing for fall 2008. Liberal opportunities are currently in place to limit the population. Bighorn hunting was initiated in the Anaconda herd in 1973 when five (¾-curl) licenses were issued; the following year five ewe licenses were added. Ram licenses have ranged from three to 18 (just before and after the die-off) with six licenses issued being typical. Ewe licenses were eliminated after the die-off in 1991 and reinitiated in 2004, when five were available; ewe licenses were increased to 20 in 2007. Nearly all ram and ewe hunters are successful harvesting a bighorn sheep in Hunting District 213.

The mean age of rams harvested in Hunting District 213 from 1990 to 2008 is 6.6 years (range 4 to 10). Mean age of harvested rams has been climbing over the last few years from seven years, in 2004, to nine years, in 2007. This significant gain reflects the large number of older rams in the Anaconda herd as well as increased hunter effort. Harvest of Boone and Crockett-class rams from this population is common.

Accomplishments: The transplant of bighorn sheep to Anaconda in 1967 has been an extraordinary success. This herd occupies all suitable habitat within the hunting district, founded the Garrison herd, and continues to pioneer new habitats. It is a rare example of a bighorn population that survived a die-off, recovered, and is expanding. Extensive sheep habitat, much of it publicly owned, has allowed this population to thrive. Numerous land purchases in the Anaconda area have benefited bighorn and other wildlife.

Since 1994, a total of 46,500 acres of land within the herd's range have been acquired by either the USFS or FWP. The 14,000-acre Lost Creek land exchange transferred ownership of most of the core sheep habitat to the

Beaverhead-Deerlodge NF. The purchase of the Garrity Mountain WMA in 2000 and the “Watershed Property” in 2001 also brought extensive habitat for sheep, elk, mule deer, and other species into public ownership. A series of small purchases of critical winter range have built the Blue-eyed Nellie WMA complex. Funding from the annual auction of a bighorn sheep license as well as from the Foundation for North American Wild Sheep, the Five Valleys Chapter of the Safari Club, and the Anaconda Sportsmen’s Club enabled FWP to add 156 acres to the Blue-eyed Nellie WMA in 2006. The Jamison addition, another 295 acres closed in April 2009.

A broad constituency of local residents, state and national sporting groups, conservation groups, and agency cooperators has enabled FWP to successfully manage the Lost Creek herd and its habitat.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. The increasing use of domestic sheep to manage weeds, the “sheep on wheels” program, as well as sheep kept as pets or on hobby farms, is of concern to bighorn managers. In the Deer Lodge Valley, the use of domestic sheep for weed control is on the upsurge, with thousands of domestic sheep brought into the valley annually. The program is active on private lands, and proposals to use domestic sheep for weed control on public lands are under consideration. A few domestic sheep are present in Anaconda’s West Valley in year-round habitat, and several thousand are being used for weed control in the Racetrack drainage.
- 2) The development of subdivisions within the core range of the Lost Creek herd presents numerous problems including potential stress to wintering and lambing sheep, direct mortality from dogs and fences, loss of landscape connectivity, game damage complaints, direct and indirect losses of habitat, and further limits to public access. Subdivision of key bighorn habitat is occurring at a rapid pace in Lost Creek, along Stucky Ridge, and in the West Valley.
- 3) Weed management throughout the herd’s range is necessary. Knapweed infestations are especially severe on private and public lands in Lost Creek and on Stucky Ridge. Efforts to enhance and maintain grassland foothills habitat will benefit bighorns.

Population Monitoring: The Lost Creek herd has been surveyed using a helicopter, in March or April, with occasional classifications conducted on the ground. Bighorns are counted and classified by age and sex, with rams classified based on horn development as Class I, II, III, or IV.

Summary of Public Comment

There is a great deal of public interest and local pride in the Lost Creek herd. Citizens are supportive of habitat acquisitions and are deeply concerned about the threat poised by domestic sheep living within the herd’s range. Also, road-kill of bighorns crossing and eating salt on MT Highway 1 is of concern to residents. Numerous individuals have suggested that a crossing structure be put in place, off-highway salting be implemented in an attempt to move sheep, or that highway crossing signs be installed. Ewe licenses are popular in the Anaconda community.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams. Maintain and enhance bighorn sheep habitat on over 138mi² of habitat connecting the Flint Creek and Anaconda-Pintler Mountain Ranges. Minimize risk of contact between bighorn and domestic sheep. Coordination with the Beaverhead-Deerlodge NF, DNRC, and private landowners is essential to control weeds, enhance grassland communities, and minimize the risk of contact with domestic sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain over 138mi² square miles (85,055 acres) of occupied bighorn sheep habitat for the benefit of bighorns and other wildlife species. Conserve landscape integrity and connectivity by precluding subdivision of critical habitats.
- 2) Encourage public and private landowners to manage their properties to maximize the quality and quantity of forage on native grasslands. Explore options to cost-share habitat improvements like weed control, prescribed burning, and, where appropriate, removal of conifers from grasslands.
- 3) Prevent over-utilization of forage on winter range by limiting the population through public hunting and capture and removal of sheep.

Habitat Management Strategies

- 1) Continue to work with private landowners; state, federal, and county governments; and conservation organizations including Five Valleys Land Trust, the Foundation for North American Wild Sheep, the Rocky Mountain Elk Foundation, Safari Club International, and others to conserve important bighorn habitat on private lands through the use of conservation easements or fee title acquisition.
- 2) Work with landowners to identify and accomplish habitat improvements on important bighorn habitats.
- 3) Work with private landowners and state, federal, and county governments to limit the use of domestic sheep and goats in the area. Coordination with the Anaconda-Deerlodge and Powell County Weed Boards, Montana State University Agricultural Extension, Montana Stock Growers Association, DNRC, and the USFS is necessary to minimize impacts to bighorns.

Game Damage Strategies

Game damage complaints related to the Lost Creek bighorn herd have been few. When game damage complaints occur, department response will be consistent with FWP's program direction including the requirement of reasonable hunting access.

Access Strategies

Maintain and enhance existing public access to state and federal lands. Pursue strategic purchases to ensure continued access to public lands in occupied bighorn habitat.

Population Objectives

- 1) Maintain the number of bighorn sheep observed during spring aerial surveys within 20% of 250 sheep (200 to 300).

- 2) Maintain a ram: ewe ratio observed during spring aerial surveys of at least 40 rams: 100 ewes with at least 40% of the rams as Class III and IV (approximately $\frac{3}{4}$ -curl or greater).

Population Management Strategies

The Hunting District 213 population objective of 250 ($\pm 20\%$) observed bighorn sheep is based on: 1) available forage on winter ranges, 2) maintaining range quality, and 3) understanding that catastrophic disease-related die-offs are often density dependent.

Currently, population management is occurring through hunter harvest of ewes and rams as well as natural mortality. An increase in the population objective for the Lost Creek herd may be warranted because of the herd's significant and ongoing range expansion.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through natural mortality and limited-entry harvest of ewes. Ewe bighorn sheep licenses in Hunting District 213 will be issued under the following prescriptions (Table 2):

Standard Regulation: A limited number of adult ewe licenses issued would be up to 15% of the number of ewes going into the fall season. A rough estimate of the number of ewes in the fall will be derived from the number of ewes observed during the annual survey, assuming a 5% mortality of adults, and adding a recruitment of one-half the previous year's lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is between 200 and 300 and lamb recruitment is over 30 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	200-300	Over 30	Limited Entry Adult Ewes	Up to 15% of Ewes
Restrictive Regulation	Less than 200	Less than 30	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	Over 300	Over 40	Limited Entry Ewes OR translocate	Up to 20% of Ewes

Table 2. Summary of regulation types under different population criteria for ewe harvest and population management.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is less than 200 and lamb recruitment is less than 30 lambs: 100 ewes.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the annual survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 300 and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 15% of the Class III and IV rams in the population.

The Standard Regulation will be recommended if: The population is within 20% of objective (200 to 300), there are 40 to 60 rams: 100 ewes, and over 40% of the rams are Class III and IV (Table 3).

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the Class III and IV rams in the population.

The Restrictive Regulation will be recommended if: The population is below 200 bighorns, there are less than 40 rams: 100 ewes, and less than 40% of the rams are Class III and IV.

Liberal Regulation: Limited-entry either-sex licenses with the number of licenses issued being up to 20% of the Class III and IV rams in the population.

The Liberal Regulation will be recommended if: The population is over 300 bighorns, there are more than 60 rams: 100 ewes, and more than 40% of the rams are Class III and IV.

WEST ROCK CREEK – QUIGG PEAK

(Upper Rock Creek)

(Hunting District 216)



Description: The Upper Rock Creek bighorn herd is located 10 miles west of Philipsburg along the main stem of Rock Creek. Occupied habitat lies primarily on the east side of Upper Rock Creek, south to the Little Hogback, and north to the confluence of the East and West Forks of Rock Creek. Bighorn sheep use habitats from the creek bottom to intermountain grassland slopes to the timbered ridges between Rock Creek and Upper Willow Creek. The population is increasing, and bighorns have been exploring lands upstream above the confluence of the East and West Forks of Rock Creek.

Ownership of the 304mi² Hunting District 216 is 19% private, 75% U.S. Forest Service (USFS) (Beaverhead-Deerlodge and Lolo National Forests; [NF], 5% Bureau of Land Management (BLM), and 1% Montana Department of Natural Resources and Conservation (DNRC). Although federal lands make up the majority of the district, much of the winter range is on privately owned cliffs, draws, and bowls above Rock Creek. Hunting district boundaries are roughly MT Highway 38 to the

Table 3.
Summary of
potential ram
harvest under
different
population
scenarios.

MOUNTAIN-FOOTHILLS	Number of Ram Licenses	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of rams Class III & IV
Standard Regulation	Up to 15% of Class III & IV rams	200-300	40-60	> 40
Restrictive Regulation	Up to 10% of Class III & IV rams	<200	< 40	< 40
Liberal Regulation	Up to 20% of Class III & IV rams	>300	> 60	> 40

south, the Sapphire Divide and Rock Creek to the west, Ranch Creek to the north, and Upper Willow Creek to the east.

Thirty percent of the district (89mi²) is used by bighorns during some part of the year. Fifty-six percent of this occupied habitat, totaling 50mi², is managed by either the Beaverhead-Deerlodge NF or Lolo NF. Occupied general and winter core habitat lies mostly between the Little Hogback and Jimmy Lee Gulch. This core habitat makes up 18% (56mi²) of the entire district, with another 11% (33mi²) of the district occupied only seasonally. While the preponderance of the seasonal habitat (87%, 28mi²) is managed by the USFS, most (61%, 34mi²) of the year-round habitat is managed by private landowners or the BLM. DNRC lands are heavily forested and are not occupied by bighorn sheep.

Bighorns thrive in Rock Creek. Habitat exists along a 3,500-foot elevational gradient from the creek to cliffs, grasslands, and forests below and along Sandstone Ridge. Most of the critical winter range is concentrated on several ranches and extensive BLM lands between Windlass and Jimmy Lee Gulches. Lambing occurs on cliffs above Rock Creek where ewes have ready access to water, forage on adjoining grasslands, and escape terrain. Summer range is typically within five miles of winter range and upslope.

Bighorn sheep are exploring habitats upstream, where some landowners are thinning forests to encourage their use. Rams from Upper Rock Creek may encounter wandering rams from the Anaconda herd in the headwaters of Rock Creek. While this interaction has not been documented, only a dozen miles separate known sightings of sheep from either population. Connectivity with bighorns from Lower Rock Creek is known. Population connectivity throughout the Upper Clark Fork between the Lost Creek, Garrison, and Upper and Lower Rock Creek herds is feasible.

Public Access: Public hunting and viewing access to the Upper Rock Creek herd is good, but declining. Several key points of access are on private lands. Access is declining as lands appreciate in value and transition from agricultural to recreational use. Existing county and forest road networks, as well as the Rock Creek corridor, allow hunters to access sheep and the public to view bighorns while driving, hiking, or floating.

Bighorn Sheep Populations: The Upper Rock Creek bighorn herd is a native population that was supplemented by the addition of 31 sheep (21 ewes, 10 rams) from the Sun River herd in

1975. Intensive research was conducted on this population in the late 1960s and early 1970s by Berwick (1968), Cooperrider (1969), and Aderhold (1972). These researchers attempted to determine the cause of a major population die-off in 1967. They gathered all available information on the herd's history, habitat use, interaction with other species, and general ecological data. Butts (1980) examined the success of and characteristics of the herd following the 1975 addition of sheep from Sun River. Population data from their research follows; additional in-depth information is available in their publications.

Reports from early explorers suggest that bighorn sheep were abundant throughout the Rock Creek drainage prior to extensive settlement and exploitation of the area. After the discovery of silver deposits in Granite County in 1864, market hunting, competition with domestic livestock, and possibly disease-related die-offs resulted in near extirpation of the species from the drainage. By 1905, only five bighorns were observed on winter ranges (Berwick 1968). Following the silver bust, regulation of and ultimately a ban on hunting bighorn sheep, the species began to recover. About 200 bighorns were thought to be in Upper Rock Creek before the die-off in 1967. Following the die-off (likely *Pasterella spp.* induced), only 15 were observed on winter ranges. Typical of a disease-mediated die-off, lamb production was very low for years following the event. However, by 1981, the population had rebuilt itself to 128 observed sheep (Figure 1 and Table 1). The herd has continued to grow, with intermittent declines, over the last quarter century, and a high of 347 bighorns were observed during a spring survey flight in 2007 (Table 2).

Data on lamb production in Upper Rock Creek is available beginning in 1990 (Table 2). An average of almost half of all ewes had lambs in this period (mean 43, range 27 to 58). Ram to ewe ratios have been extremely variable from 14 to 275 rams: 100 ewes. This variability is the result of changing hunting regulations and is accentuated by year-to-year variations in the visibility of rams. Class III and IV rams were dominant in the population until 2003, when a sustained high rate of harvest from the 1990s and early 2000s caught up with the population.

Bighorns were removed from Upper Rock Creek in 1984 – one to an unknown location (likely Thompson Falls), 1987 – 10 to Boulder River (Park County) and 27 to Bonner (Missoula County), and 1996 – 20 to the Beartooth Wildlife Management Area (Cascade County) and 25 to the Elkhorns (Jefferson County). In total, 83 bighorns have

Figure 1.
Total number
of bighorn
sheep observed
during aerial
trend surveys
in the Upper
Rock Creek
population,
Hunting District
216, 1981-2008.

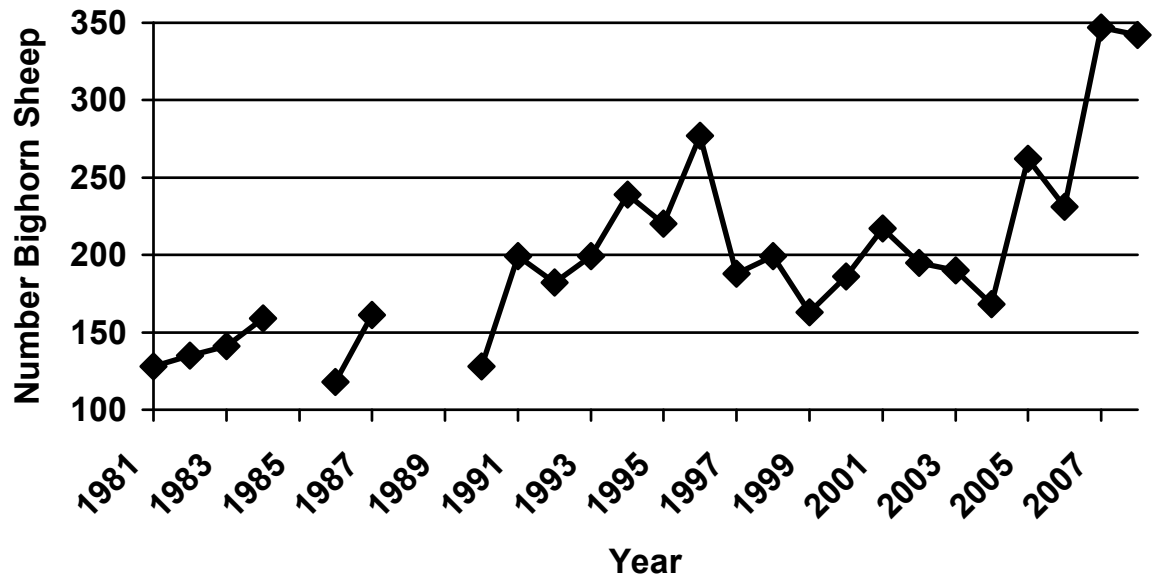


Table 1.
Total population
counts for
the Upper
Rock Creek
population,
Hunting District
216; 1981-1987.

Year	Total bighorn
1981	128
1982	135
1983	141
1984	159
1986	118
1987	161

been removed from Hunting District 216 to supplement or establish populations elsewhere in Montana. Despite increases in ewe permits, the bighorn population is stable to increasing and should again be considered as a source for transplants.

Recreation Provided: Like many hunting districts, the odds of drawing a ram license in Hunting District 216 are less than 1%, and hunters who do draw usually harvest a ram. In 2007, hunters spent 17 days pursuing rams and 41 days hunting ewes in Hunting District 216. Generally, sheep hunters spend more time in the district, but in 2007 there were only four ram: mits, and each hunter spent an average of only 4.2 days hunting. Total public time spent watching bighorns is far in excess of hunter days, yet is difficult to quantify. Many floaters and fishermen on Rock Creek as well as travelers, landowners, and locals enjoy watching these bighorn sheep.

Current Annual Bighorn Sheep Harvest: In Upper Rock Creek, eight either-sex and 20 ewe licenses were available by special drawing for fall 2008. Liberal ewe harvest opportunities are currently in place to manage the population, and additional ewe licenses or removals may be warranted in the future. Although bighorns

were harvested earlier in the century, the first hunting season recorded in Pittman-Robertson Reports is 1979 when one license was filled. Subsequently, ram license numbers have ranged from one to 16 with over eight licenses issued annually being common. Ewe licenses were initiated in 1980, and the number issued has ranged from five to 40 with an average of 15 licenses being issued annually. The mean age of rams harvested in Hunting District 216 from 1979 to 2007 is 6.1 years (range 1.5 to 11.5). The greatest number of older rams taken in Hunting District 216 was in 1992 when a remarkable eight rams over nine years old were taken. The harvest of 112 rams in the following decade reduced the mean age of harvested rams from 7.4 years in 1992 to 4.9 years in 2003. As license numbers were reduced during the last five years, the mean age of harvested rams has risen to its long-term average of six years.

Accomplishments: The Upper Rock Creek sheep population has been resilient. The herd recovered from near elimination in the early 20th century, in 1967, and during other undocumented die-offs. The herd is at a record high, and individual sheep are exploring new habitats. Most suitable habitat within the hunting district is occupied. Extensive quality sheep habitat has allowed this population to recover from declines.

A broad constituency of local residents, state and national sporting groups, conservation groups, and agency cooperators has enabled FWP to successfully manage the Upper Rock Creek herd and its habitat.

Year	Date	Rams (degree of horn curl)				Ewes and Lambs			Uncl	Total Sheep	Rams/ 100 Ewes	Lambs/ 100 Ewes
		3/4+	1/2-3/4	<1/4- 1/2	Total	Ewes	Lambs	Total				
1990	13-Jan	49	21	5	75	37	16	53	0	128	203	43
1991	10-Jan	55	18	13	86	75	38	113	0	199	115	51
1992	10-Mar	62	10	6	78	82	22	104	0	182	95	27
1993	4-Jan	48	16	15	79	76	44	120	0	199	104	58
1994	1-Mar	68	12	0	80	122	37	159	0	239	66	30
1995	1-Jan	65	14	12	91	85	44	129	0	220	107	52
1996	10-Jan	93	25	10	128	100	49	149	0	277	128	49
1997	1-Jan	33	8	16	57	86	45	131	0	188	66	52
1998	4-Jan	56	14	3	73	86	40	126	0	199	85	47
1999	7-May	54	8	2	64	70	29	99	0	163	91	41
2000	21-Apr	84	10	5	99	36	13	49	38	186	275	36
2001	10-Apr	62	13	12	87	76	26	102	28	217	115	34
2002	16-Jan	34	0	0	0	0	0	0	161	195	N/A	N/A
2003	7-Jan	23	14	20	60	89	41	130	0	190	67	46
2004	31-Mar	15	16	5	36	87	45	132	0	168	41	51
2005	11-Mar	13	21	25	59	100	28	128	75	262	59	28
2006	31-Mar	5	12	5	22	155	52	207	2	231	14	34
2007	30-Mar	31	36	31	103	73	40	113	131	347	N/A	55
2008	4-Apr	33	33	16	82	153	64	217	43	342	54	42

Table 2.
Classification
data from
aerial surveys
in the Upper
Rock Creek
population,
Hunting District
216, 1990-2008.

Management Challenges:

1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. The increasing use of domestic sheep to manage weeds, the “sheep on wheels” program, as well as sheep kept on hobby farms or as pets, is a threat to wild sheep. In Upper Rock Creek, specifically, no domestic sheep are known, but their use for weed control, as commercial livestock, and as pets is expanding in Granite County. Weed boards and some agencies are encouraging the expanded use of domestic sheep and goats.

2) Habitat for the Upper Rock Creek herd is secure at this time, due to large federal holdings and the continued use of private lands for ranching. Private land conservation is essential to prevent future habitat loss. Recent sales of ranches in the area to

recreational users may diminish bighorn habitat and public access.

3) Weed management throughout the herd’s range is ongoing and important to continue. Efforts to enhance and maintain grassland foothills habitat using targeted weed control and prescribed burning will benefit bighorns.

Population Monitoring: The Upper Rock Creek bighorn herd is surveyed using a helicopter, during winter conditions in January, March or April. An unbroken 19-year data stream exists for Hunting District 216. Bighorns are counted and classified by age and sex, with rams classified based on horn development as Class I, II, III, or IV (Geist 1971).

Summary of Public Comment

Outfitters, ranchers, hunters, wildlife watchers, and the general public all have an interest in Rock Creek bighorn sheep. Numerous trophy

rams taken in the drainage, including a world record scoring 204 7/8 Boone and Crockett, have helped Rock Creek to become one of the best-known sheep herds in Montana. Permit levels for Rock Creek are watched closely with a correspondingly high level of public input. Access is the predominant concern for the public. Constituents pay close attention to this herd and management actions within Rock Creek.

Management Goal

Manage for a healthy and productive bighorn sheep population with a goal of producing trophy class rams. Maintain and enhance bighorn sheep habitat on a landscape scale. Close coordination with the Beaverhead-Deerlodge and Lolo NF, the BLM, and private landowners is essential to control weeds, enhance grassland communities, and minimize the risk of contact with domestic sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain over 89mi² square miles (56,681 acres) of occupied bighorn sheep habitat for the benefit of bighorns and other wildlife species. Conserve landscape connectivity by precluding subdivision of critical habitats.
- 2) Encourage public and private landowners to manage their properties to maximize the quality and quantity of forage on native grasslands. Explore options to cost-share habitat improvements like weed control, prescribed burning, and, where appropriate, removal of conifers from grasslands.
- 3) Prevent over-utilization of forage on winter range by limiting the population, through public hunting and the capture and removal of sheep.

Habitat Management Strategies

- 1) Work with private landowners; and state, federal, and county governments to limit the use of domestic sheep and goats in the area. Coordination with the Granite County Weed Board, Montana State University Agricultural Extension, Montana Stock Growers Association, the BLM and the USFS is necessary to minimize impacts to bighorn and maximize improvements to sheep range.
- 2) Work with private landowners; state, federal, and county governments; and conservation

organizations including Five Valleys Land Trust, the Foundation for North American Wild Sheep, the Rocky Mountain Elk Foundation, Safari Club International, and others to conserve important bighorn habitat on private lands through the use of conservation easements or fee title acquisition.

- 3) Work with landowners to identify and accomplish habitat improvements on important bighorn habitats. Also, it is important to ensure that projects prescribed to benefit bighorn do in fact have positive results.

Game Damage Strategies

Game damage complaints related to the Upper Rock Creek bighorn herd have been few. When game damage complaints occur, department response will be consistent with FWP's program direction including the requirement of reasonable hunting access.

Access Strategies

Maintain and enhance existing public access to state and federal lands. Pursue strategic purchases to ensure continued access to public and private lands in bighorn habitat.

Population Objectives

- 1) Maintain the number of bighorn sheep observed during spring aerial surveys within 20% of 300 sheep (240 to 360).
- 2) Maintain a ram: ewe ratio observed during spring aerial surveys of 40 rams: per 100 ewes with at least 50% of the rams as Class III and IV (approximately ¾-curl or greater).

Population Management Strategies

The Hunting District 216 population objective of 300 (\pm 20%) observed bighorn sheep is based on: 1) available forage on winter ranges, 2) maintaining range quality, 3) understanding that catastrophic disease-related die-offs are often density dependent, and 4) a desire to maintain a robust and sustainable population.

Population management is occurring through hunter harvest of ewes and rams as well as natural mortality. The most recent capture and removal operation was in 1996 when 45 sheep were removed.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through natural mortality, limited-entry harvest

of ewes, and, when appropriate, removal of animals for translocation. Ewe bighorn sheep licenses in Hunting District 216 will be issued under the following prescriptions (Table 3):

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	240-360	Over 30	Limited Entry Adult Ewes	Up to 15% of Ewes
Restrictive Regulation	Less than 240	Less than 30	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	Over 360	Over 40	Limited Entry Ewes OR translocate	Up to 20% of Ewes

Table 3. Summary of regulation types under different population criteria for ewe harvest and population management.

Standard Regulation: A limited number of adult ewe licenses will be issued with the number of licenses issued being up to 15% of the number of ewes going into the fall season. A rough estimate of the number of ewes in the fall will be derived from number of ewes observed during the annual survey, assuming a 5% mortality of adults, and adding a recruitment of one-half the previous year's lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is between 240 and 360 and lamb recruitment is over 30 lambs: 100 ewe.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is less than 240 and lamb recruitment is less than 30 lambs: 100 ewes.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the annual survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs,

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 360 and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 15% of the Class III and IV rams in the population.

The Standard Regulation will be recommended if: The population is within 20% of objective (240 to 360), there are 40 to 60 rams: 100 ewes, and over 50% of the rams are Class III and IV (Table 4).

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the Class III and IV rams in the population.

The Restrictive Regulation will be recommended if: The population is below 200 bighorn, there are less than 40 rams: 100 ewes, and less than 50% of the rams are Class III and IV.

Liberal Regulation: Limited-entry either-sex licenses with the number of licenses issued being up to 20% of the Class III and IV rams in the population.

MOUNTAIN-FOOTHILLS	Number of Ram Licenses	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of rams Class III & IV
Standard Regulation	Up to 15% of Class III & IV rams	240-360	40-60	> 50
Restrictive Regulation	Up to 10% of Class III & IV rams	<240	< 40	< 50
Liberal Regulation	Up to 20% of Class III & IV rams	>360	> 60	> 50

Table 4. Summary of potential ram harvest under different population scenarios.

The Liberal Regulation will be recommended if: The population is over 300 bighorns; there are more than 60 rams; 100 ewes, and more than 50% of the rams are Class III and IV.

WEST FORK BITTERROOT (Hunting District 250)



Description: Bighorn sheep Hunting District 250 is immediately southwest of Darby. The area includes the West Fork of the Bitterroot River and the region west of U.S. Highway 93 draining into Camp Creek and the East Fork of the Bitterroot River. The entire hunting district is about 707mi² with 94%, or 662 square miles, managed by the Bitterroot National Forest. The Montana Department of Natural Resources and Conservation (DNRC) manages 1%, 6mi², and the remaining 5%, 37mi², are private lands.

Bighorn sheep occupy about 190mi² of the hunting district. There are two herd units within Hunting District 250. The Nez Perce, or Watchtower, subunit occupies about 112 mi² of the hunting district and is the only fully native bighorn population left in the Bitterroot Valley. The Painted Rocks subunit occupies about 77mi² of this hunting district. There is limited information regarding the mixing of these two populations. There is sufficient evidence of mixing, however limited, to not claim these subunits as separate populations.

About 98% of the occupied sheep habitat in Hunting District 250 is public land. Almost 90% of the occupied sheep habitat within the Watchtower subunit is wilderness. Only 4mi² are considered winter range. The lack of winter range is a major limitation to the possible expansion or growth of this subunit. The occupied sheep habitat within the Painted Rocks subunit is almost exclusively public land. Thirteen square miles are considered winter range.

The majority of bighorn sheep that inhabit the Watchtower area move into Idaho, along the Selway River, during the winter months. Few are found on the limited winter ranges in Montana. Eighteen bighorns were observed along the lower elevations of Watchtower and Sheephead Creeks in 2002. Winter range surveys in Idaho from 1978 to 1984 found from 58 to 109 sheep along the Selway winter ranges. Winter

range surveys in 1994 and 1995 found 38 and 45 sheep, respectively, wintering along Idaho's Selway River.

Although historical observations of sheep in the Painted Rocks area were occasional, recent occupation by sheep occurred as a result of reintroductions in 1990, 1991, and 2004. FWP reintroduced 38 sheep from the Sun River herd in March 1990. An additional release of 28 bighorns from the Anaconda herd occurred in February 1991. This subunit suffered from several years of poor lamb survival. That situation prompted FWP to augment the existing herd with 10 sheep from the Sun River in February 2004.

The bulk of the Painted Rocks sheep winter along the rocky, south-facing bunchgrass slopes north of Painted Rocks Reservoir. This winter range is complicated by a mature ponderosa pine overstory that dominates much of the landscape in addition to infestations of spotted knapweed. Mature ponderosa pines are highly resistant to stand-replacing fires. The noxious weed infestations are difficult to access due to the steep and rocky terrain. Other habitat manipulation techniques will be required to reclaim the native bunchgrass habitat in the Painted Rocks winter range.

Summer ranges for the Watchtower bighorns occur near the upper elevations of Watchtower and Sheephead Creeks and along the Montana-Idaho divide toward Nez Perce Pass. Some are found as far east as the Little West Fork Creek. The Painted Rocks sheep tend to stay fairly close to the cliffs and open slopes north of Painted Rocks Reservoir.

Public Access: The majority of lands within this hunting district are public lands. Motorized and nonmotorized access is excellent throughout most of this area. Major trailheads occur in Watchtower and Sheephead Creeks. Road access along Painted Rocks Reservoir and the Nez Perce Road allow sufficient access to most of the public lands within the hunting district. These areas also host significant hunting opportunities for other big game species and upland game birds.

Bighorn Sheep Population: Bighorns in the Watchtower portion of the hunting district are native sheep. However, most of these sheep move to winter ranges near Idaho's Selway River and are therefore only temporary residents of Montana.

Although bighorns made occasional appearances in the Painted Rocks area, there is no substantiated information that a native population maintained a persistent presence in

that area. The Painted Rocks sheep began to occupy the area consistently because of three transplanting operations, which included; in 1990, 38 sheep from the Sun River, in 1991, 28 sheep from Lost Creek and in 2004, 10 sheep from the Sun River.

Aerial surveys in Hunting District 250 were not flown in 2007-08. However, Figure 1 and Table 1 provide the survey results for the Painted Rocks portion of the hunting district. The most current survey information for the Watchtower portion of the hunting district located 18 sheep during a late winter/early spring flight in 2002. Recent survey efforts included flights on a three-year rotation.

As is often the case, ram observations are

highly variable during spring aerial surveys. Neither the rams nor lambs: 100 ewes ratio observed during winter or spring surveys since 2003 are particularly exceptional. These population characteristics are considered marginal compared to other bighorn sheep populations in Montana.

Recreation Provided: Both subunits of this population provide watchable wildlife opportunities for local residents, including residents of the greater Bitterroot Valley. The bighorns wintering near Painted Rocks are more visible, and there are simply a greater number of sheep in this subunit compared to the Watchtower subunit. Interest in hunting sheep

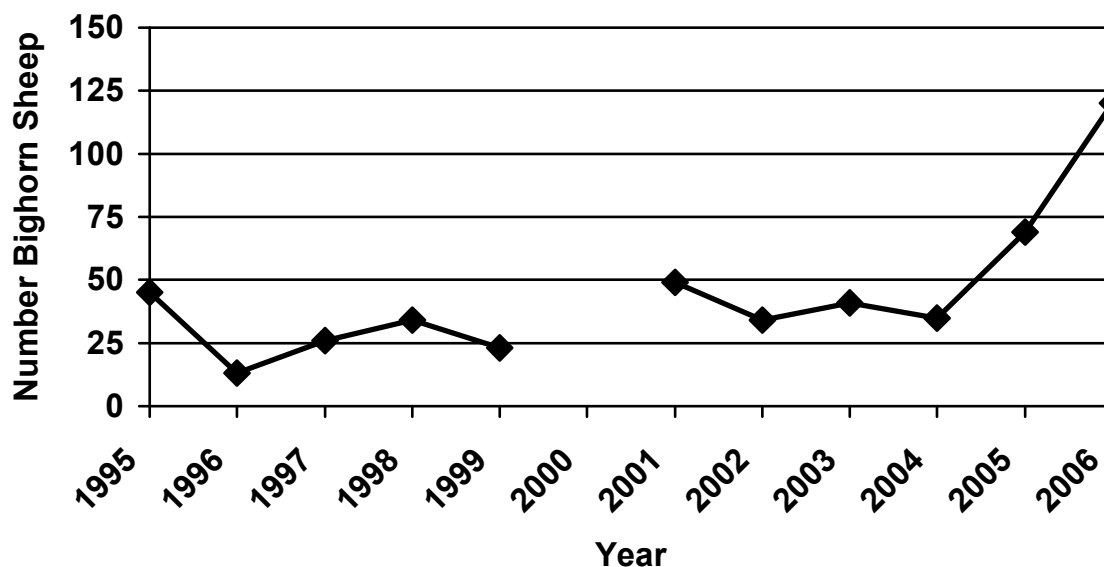


Figure 1. Total number of bighorn sheep observed during aerial trend surveys in the West Fork Bitterroot population, Hunting District 250, 1995-2006.

					Rams						Per 100 ewes	
Year	Date	Total	Ewes	Lambs	Ylg	I	II	III	IV	Total	Rams	Lambs
1995		45	26	12			4	2	1	7	27	46
1996		13	6	4			2	1		3	50	67
1997		26	18	3			2	1	2	5	28	17
1998		34	15	7			8	1	3	12	80	47
1999		23	8	6			2	4	3	9	113	75
2001		49	25	13			5	3	3	11	44	52
2002	18-Apr	34	25	2		1	1	4	1	7	28	8
2003	2-Jan	41	22	12		3	4			7	32	64
2003	16-Apr	41	28	12	1					1	4	43
2004	6-Jan	45	27	10	0	5	1	2	0	8	30	37
2004	17-Apr	35	23	8		1	1	2		4	17	35
2005	12-Jan	59	34	14		7	0	2	2	11	32	41
2005	21-Mar	69	45	17		7				7	16	38
2006	5-Jan	120	68	21		5	10	13	3	31	46	31

Table 1. Bighorn sheep counts and classifications in the Painted Rocks area, Hunting District 250, 1995-2006.

in this hunting district is fairly high. In 2007, 97 hunters applied for two either-sex licenses valid in the Painted Rocks portion of Hunting District 250, and 21 hunters applied for one legal ram license in the Watchtower portion of this district.

Current Annual Bighorn Sheep Harvest:

Presently, two either-sex licenses are available for the Painted Rocks portion of the hunting district 250. Hunter success for these permits is over 95%. Although these licenses are an either-sex opportunity, hunters typically harvest rams. In comparison, hunter success for the single legal ram license available in the Watchtower portion of the district runs about 45%.

Between the years 1968 and 1989, five either-sex licenses were available district wide, and the average harvest during those years was 1.9 sheep. Two either-sex licenses were issued for each of the years 1990 to 1993 with a hunter success of 62% and an average of 1.25 sheep harvested per year.

Accomplishments: This population of bighorn sheep is well established in all suitable habitats in the hunting district.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. There are domestic sheep within eight miles of the Painted Rocks subunit. Although the domestic sheep occur on private lands, they are essentially free roaming and easily drift onto adjoining U.S. Forest Service (USFS) lands.
- 2) Weeds are a ubiquitous problem, and conifer encroachment is occurring in some areas of bighorn range.
- 3) Maintaining or expanding winter range opportunities for bighorns, especially in the Watchtower/Sheephead drainages. Stimulating shrub and grass production and removing coniferous overstory are key elements to winter range improvement in this area.
- 4) Monitoring these subunits on a more consistent basis.

Population Monitoring: This bighorn population is surveyed on winter range from a helicopter on an irregular basis. These aerial surveys occur in early spring. Bighorns are counted and classified by age and sex. Rams are

classified based on horn development as yearling or Class I, II, III, or IV (Geist 1971).

Summary Of Public Comment

Public comments related to the bighorn sheep population and its management in this hunting district indicates a high level of support for FWP's management direction. Both hunters and non-hunters enjoy seeing bighorn sheep in this area.

Management Goal

Protect the unique and endemic subunit of sheep in the Watchtower/Sheephead drainages. This subunit does not have the ability to expand to any significant degree. It is important to manage these sheep accordingly and work toward improving and expanding winter range opportunities in this area.

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams. There may be some opportunity for an increase in sheep numbers. Maintain the limited opportunity for bighorn sheep hunters to harvest sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain about 190 square miles of occupied bighorn sheep habitat for the benefit of bighorns, other wildlife species, and other agency-mandated uses.
- 2) Encourage improvement of habitat conditions, particularly weed management, on publicly owned winter ranges (primarily USFS) so that vegetation conditions on these ranges provide adequate forage for bighorns and other wildlife during the winter.
- 3) Encourage maintenance and improvement of habitat conditions on public lands (USFS).

Habitat Management Strategies

- 1) Cooperate with the USFS on prescribed burning and weed treatment projects to make sheep habitats more productive.
- 2) Where identified as necessary, work with the USFS to limit motorized use, particularly off-trail OHVs and motorcycles, in the area.
- 3) Continue to work with private landowners and Ravalli County to limit the use of domestic sheep and goats in the area.

Game Damage Strategies

At present there are no game damage complaints related to bighorn sheep in Hunting District 250. If game damage problems develop, they will be addressed on a case-by-case basis consistent with FWP's Game Damage Program. If it is determined that a population reduction is necessary, it could be accomplished through hunting and sheep capture for transplanting.

Access Strategies

Maintain the current level of public access on public lands. However, to maintain habitat security and protect habitat, FWP should work with the USFS and DNRC to limit use of OHVs and motorcycles where necessary.

Population Objectives

The consistency of observing adult rams, especially during spring green-up surveys, varies greatly between years. Oftentimes, discretion by the managing biologist regarding survey conditions is important when interpreting survey results.

Watchtower/Sheephead Subunit:

The difficulty with this subunit is being able to classify enough sheep to provide an accurate rams and lambs: 100 ewe ratio. One option is to attempt to survey these sheep during the rut (post-hunting season) in an effort to obtain a more accurate estimate of sheep available to hunters during the hunting season, and classify enough sheep to provide a more accurate ram and lamb: 100 ewe ratio.

An achievable population goal, contingent on habitat improvements on winter ranges, would be 45 to 60 sheep. However, current population goals for this subunit include:

- 1) Maintain the number of bighorn sheep observed during "good" post-winter aerial surveys within 20% of 20 sheep (16 to 24). Work with Idaho Fish and Game to address more frequent survey efforts on winter ranges along the Selway River and work with the USFS to expand winter range.
- 2) Maintain a rams: 100 ewe ratio observed during "good" post-season aerial surveys of at least 40 rams: 100 ewes with at least 40% of the rams as Class III and IV (approximately $\frac{3}{4}$ -curl or greater).
- 3) Maintain a minimum 35 lambs: 100 ewes.

Painted Rocks Subunit:

- 1) Maintain the number of bighorn sheep observed during "good" post-winter aerial surveys within 20% of 120 sheep (96 to 144).
- 2) Maintain 50 rams: 100 ewes with a minimum of 40% of the rams Class III or larger.
- 3) Maintain lamb production at a minimum of 35 lambs: 100 ewes over a three-consecutive year average.

Population Management Strategies

FWP will work with the USFS to improve and expand winter ranges for both herd subunits. Also, the primary population management activity will be hunting for either-sex sheep in the Painted Rocks area and legal ram opportunities in the Watchtower/Sheephead area.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed statewide through limited-entry harvest of ewes and capture operations. Due to the relatively small populations in both the Watchtower/Sheephead and Painted Rocks subunits and because bighorn numbers in both subunits appear to be naturally regulated, ewe harvest is not recommended at this time. Should this situation change, appropriate strategies to manage bighorn numbers will be explored and recommended.

Watchtower/Sheephead Subunit:

Rams: Because of the limited number of bighorns in this subunit this subunit is hunted conservatively with legal ram licenses issued for up to 20% of the Class III and IV rams (approximately $\frac{3}{4}$ -curl and greater) observed during survey efforts. Generally, this has resulted in issuing one license.

Painted Rocks Subunit:

Rams: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 20% of the Class III and IV rams (approximately $\frac{3}{4}$ -curl and greater) observed during survey efforts.

SKALKAHO (Hunting District 261)



Description: Bighorn sheep Hunting District 261 lies east and southeast of Hamilton. It is about 540mi² with most of it, 52% or 280 mi², administered by the Bitterroot National Forest. Other public lands include 14mi² (3%) owned by the Montana Department of Natural Resources and Conservation (DNRC) and the relatively small (3.4mi²) Calf Creek Wildlife Management Area (WMA) owned by FWP. The remaining 54% of the hunting district, some 292mi², is privately owned.

Bighorn sheep occupy about 82mi² of the hunting district, mostly in Skalkaho Creek (hence these sheep are commonly called the “Skalkaho herd”) but also in Sleeping Child and Gird Creeks. Sixty-five percent (53mi²) of the herd’s range is public land and 8% (6.3mi²) is private land protected by a conservation easement held by the Rocky Mountain Elk Foundation. Within the occupied area are five smaller areas totaling 26 mi² (32% of occupied range) of lower-elevation, steep, rocky, cliff-type habitat that sheep favor year-round and concentrate on in winter. Sheep have occasionally been seen outside the “normal” range described above, most notably on Deer Mountain east of Darby. In 2002, a three-year-old radio-collared bighorn ram from the

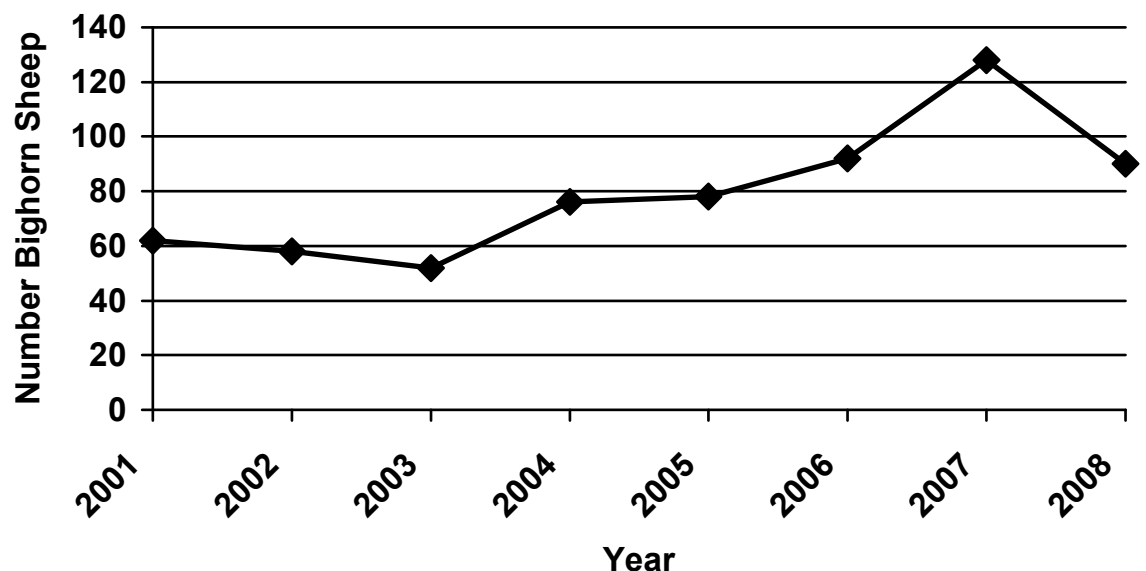
Skalkaho area was followed to Whiskey Gulch, in bighorn sheep Hunting District 270. This was about 10 miles southeast of Darby and about 15 miles south of its “normal” range, where it stayed for a while before returning. This ram was later destroyed because it had been near a small herd of domestic sheep at the mouth of Whiskey Gulch.

The quality and quantity of winter range forage is good due to a 2000 forest fire that burned much of the area. Weeds, especially spotted knapweed, are widespread, and conifer encroachment is occurring on those areas not affected by fire.

Public Access: Access via Forest Service roads to the majority of the hunting district is very good. The area occupied by bighorn sheep within this hunting district is also popular for hunting other kinds of wildlife including deer, elk, mountain lions, bears and upland birds.

Bighorn Sheep Populations: The Skalkaho area is historical bighorn habitat, but sheep had not been observed there more recently until 1973, one year after a reintroduction into the East Fork of the Bitterroot east of Sula, when two ewes were seen. In 1988, three sheep were observed: a ram, a ewe, and a lamb. By 1999, there were about 36 sheep, and the herd was supplemented with 27 animals from the Sun River herd in early 2000. Currently, it is estimated there are about 130 bighorns in the herd (Figure 1 and Table 1). As of 2008, this is a fairly “young” and growing population. It has not been necessary to institute the harvest of ewes or to capture sheep to reduce the population. However, these steps may be necessary in the future to control herd size. Starting in 2000, Nicholas DeCesare used

Figure 1.
Total number of bighorn sheep observed during aerial trend surveys in the Skalkaho population, Hunting District 261, 2001–2008.



Date	Total	Ewes	Lambs	Rams						Uncl	Per 100 ewes	
				Ylg	I	II	III	IV	Tot		Lambs	Rams
01 Aug 2001 ¹	49	19	9		4	9	5	3	21		47	111
Sept 2001	62	27	11						24		41	89
26 Dec 2001	30	12	6		2	3	3	2	10	2	50	83
Aug 2002	58	25	8						25		32	100
15 & 16 Apr 2003	52	27	2	2		7	8	6	23		7	85
5 Jan 2004	82	41	19		2	4	7	9	22		46	54
16 Apr 2004	76	34	14		5	10	4	9	28		41	82
4 Aug 2004 ¹	27	15	10	1					1		67	7
12 Jan 2005	59	34	14		7	0	2	2	11		41	32
20 Mar 2005	78	49	14		3	5	2	4	15	1	29	31
4 Jan 2006	74	12	6		3	2	1	2	8	48	50	67
21 Mar 2006												
28 Mar 2006	92	50	11	2	3	8	8	10	31		22	62
5 Jan 2007	128	69	24		9	4	9	13	35		35	51
2 Apr 2007	99	62	14		6	0	0	2	8	15	23	24
2 Jan 2008	90	51	18	0	8	6	2	2	18	3	35	35

Table 1.
Helicopter
counts and
classifications
in the Skalkaho
population,
Hunting District
261, 2001–2007.

¹Ground survey

nine radio-collared sheep from this population as part of his master's degree project that evaluated distribution, movements, and habitat selection. His findings are reported in his 2002 thesis "Movement and Resource Selection of Recolonizing Bighorn Sheep in Western Montana" (University of Montana, Missoula).

During good years, recruitment may be 40 to 50 lambs: 100 ewes seen during spring surveys, but lamb: ewe ratios have often been below 35:100. The number of rams seen during surveys has varied widely suggesting that sightability of rams, particularly adult ram groups, can be low and is unreliable in these habitats.

In 2001, seven bighorns were captured and radio-collared in Skalkaho Creek to augment the two that had been collared when transplanted in 2000 as part of the aforementioned graduate project. Two other sheep in the population were already wearing radio collars, having been so equipped when translocated to the area in 2000. No bighorns have been captured and removed from the Skalkaho herd.

Recreation Provided: This population is a popular watchable wildlife opportunity enjoyed by hundreds of people because it is close to Hamilton and the sheep are often seen along the Skalkaho Highway, MT Highway 38. Hunting is also a popular recreational pursuit enjoyed by the lucky people who draw a bighorn license. Currently, there are about 50 to 60 hunter days per year associated with the Skalkaho herd.

Current Annual Bighorn Sheep Harvest:

Hunting began in 2000 with one either-sex license and is now at five either-sex licenses. Hunter success has been 100% from 2000 to 2007. In recent years, it has not been uncommon for a Boone and Crockett-size ram to be harvested in Hunting District 261. In 2007, the largest ram ever harvested in the Bitterroot Valley came out of this hunting district, an 8½-year-old that scored 193 2/8.

Accomplishments: This population of bighorn sheep is well established in all suitable habitats in the hunting district.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. There are two large domestic sheep producers within a few miles of the bighorn range: one less than 1½ miles to the east across Sleeping Child Creek and the other about 2½ miles to the east across the Bitterroot River. Additionally, there are a number of hobby producers of domestic sheep in the Bitterroot Valley including the one mentioned earlier in Whiskey Gulch about 15 miles south of the "normal" bighorn range in Hunting District 261. In June of 2004, a private individual released an unknown number (believed to be about 35) of domestic churro sheep on USFS land in Daly Creek within the range

of the Skalkaho bighorn sheep herd. Forest Service and FWP personnel rounded up most of these, and an additional 13 were killed by FWP staff over the next few months. This incident illustrates some of the problems that can accompany a growing human population and the spread of “hobby” ranches. Although not employed in the Bitterroot Valley yet, the increasing use of domestic sheep to manage weeds, colloquially known as the “sheep on wheels” program, is of concern to bighorn managers.

- 2) Loss of wildlife habitat is occurring in this hunting district; housing developments on bighorn range areas and along migratory routes are common. Road-kills on the Skalkaho Highway, MT Highway 38, number about two to four annually.
3. Weeds are a ubiquitous problem, and conifer encroachment is occurring in some areas of bighorn range.

Population Monitoring: This bighorn population is surveyed on winter range from a helicopter while surveying mule deer in the same area. Consequently, it usually gets counted twice a year: once in late December or early January and again during spring green-up in April. Bighorns are counted and classified by age and sex. Rams are classified based on horn development as yearling or Class I, II, III, or IV (Geist 1971).

Summary of Public Comment

Public comments related to the bighorn sheep population and its management in this hunting district indicates a high level of support for FWP’s management direction. Both hunters and non-hunters enjoy seeing bighorn sheep in this area.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams. There may be some opportunity for an increase in sheep numbers. Cooperate with public land management agencies and private individuals in the management of bighorn habitats. Maintain good opportunity for bighorn sheep hunters to harvest sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain about 82mi² (52,500 acres) of

occupied bighorn sheep habitat for the benefit of bighorns, other wildlife species, and other agency-mandated uses.

- 2) Encourage improvement of habitat conditions, particularly weed management, on publicly owned winter ranges (primarily USFS) so that vegetation conditions on these ranges provide adequate forage for bighorns and other wildlife during the winter.
- 3) Encourage maintenance and improvement of habitat conditions on public lands (USFS) so that bighorns continue to utilize these lands during summer and fall rather than moving onto private land. Prevent over-utilization of forage by limiting the population, when necessary, through public hunting and capture and removal of sheep.

Habitat Management Strategies

- 1) Cooperate with the USFS on prescribed burning and weed treatment projects to make sheep habitats more productive.
- 2) Where identified as necessary, work with the USFS to limit motorized use, particularly off-trail OHVs and motorcycles, in the area to minimize displacement of sheep from preferred habitats and to limit the spread of weeds.
- 3) Continue to work with private landowners and Ravalli County to limit the use of domestic sheep and goats in the area.
- 4) Continue to work with private landowners, Ravalli County, particularly the Ravalli County Open Lands Board, and organizations like the Foundation for North American Wild Sheep, the Rocky Mountain Elk Foundation, Safari Club International, the Ravalli County Fish & Wildlife Association, and others to conserve important bighorn habitat on private lands through the use of conservation easements or fee title acquisition.

Game Damage Strategies

At present there are few game damage complaints related to bighorn sheep in Hunting District 261. If game damage problems develop, they will be addressed on a case-by-case basis consistent with Montana FWP’s Game Damage Program. If it is determined that a population reduction is necessary, it could be accomplished through hunting and sheep capture for transplanting.

Access Strategies

Maintain the current level of public access on public lands. However, to maintain habitat security and protect habitat, FWP should work with the USFS and DNRC to limit use of OHVs and motorcycles where necessary.

Population Objectives

When considering the following population objectives, it must be kept in mind that the observability of these sheep, particularly the adult ram groups, varies considerably. Consequently, much must be left to the discretion of the managing biologist as to whether he/she has made a “good” count on any particular flight.

- 1) Maintain the number of bighorn sheep observed during “good” post-winter aerial surveys within 20% of 120 sheep (96 to 144).
- 2) Maintain a ram: 100 ewe ratio observed during “good” post-season aerial surveys of at least 60 rams: 100 ewes with at least 40 % of the rams as Class III and IV (approximately $\frac{3}{4}$ -curl or greater).

Population Management Strategies

The population objective of 120 ($\pm 20\%$) observed bighorn sheep is largely based on: 1) the ability of public and private lands to provide habitat for wintering bighorns, 2) vehicular/ bighorn collisions on the Skalkaho Highway, and particularly, 3) the understanding that catastrophic disease-caused die-offs are often density dependent occurrences.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through limited-entry harvest of ewes. The following prescriptions are recommended

guidance provided no other extenuating circumstances arise, such as gross habitat changes, disease outbreak, or a groundswell of public sentiment or change in department direction. In general, bighorn sheep licenses in Hunting District 261 are issued under the following prescriptions (Table 2):

Standard Regulation: A limited number of adult ewe licenses – up to 20% of the number of ewes going into the fall season. A suggested model to determine the number of ewes going into the fall season would be the number of ewes observed during the annual survey, assuming a 5% mortality of adults, and adding a recruitment of one-half the previous year’s lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is between 96 and 144 and lamb recruitment is above 35 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is less than 96 and lamb recruitment is less than 30 lambs: 100 ewes.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the annual survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year’s lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	96-144	Above 30	Limited Entry Adult Ewes	Up to 20% of Ewes
Restrictive Regulation	<96	Less than 30	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	>144	> 40	Limited Entry Ewes OR translocate if > 25 sheep including rams are available	More than 20% of Ewes

Table 2. Summary of regulation types under different population criteria for ewe harvest and population management.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 144 and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 20% of the Class III and IV rams in the population (approximately ¾-curl and greater).

The Standard Regulation will be recommended if: The population is within objective (+ 20% of 120), there are more than 30 rams: 100 ewes, and 30% of the rams are Class III and IV (Table 3).

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the Class III and IV rams in the population.

The Restrictive Regulation will be recommended if: The population is more than 20% below the population objective of 120, there are less than 30 rams: 100 ewes, less than 30 lambs: 100 ewes, and less than 30% of the rams are Class III and IV.

Liberal Regulation: Limited-entry either-sex licenses with the number of licenses issued being more than 20% of the Class III and IV rams in the population.

The Liberal Regulation will be recommended if: The population is more than 20% above the objective of 120, there are more than 80 rams: 100 ewes, and more than 30% of the rams are Class III and IV.

EAST FORK BITTERROOT (Hunting District 270)



Description: Bighorn sheep Hunting District 270 is about 5 miles southeast of Darby. It is about 326mi² with 85%, or 277mi², managed by the Bitterroot National Forest. The Montana Department of Natural Resources and Conservation (DNRC) manages 6%, or 20mi², and the remaining 9%, or 29mi², is privately owned.

Bighorn sheep occupy about 121mi² of the hunting district, mostly in the East Fork of the Bitterroot; hence these sheep are commonly called the “East Fork herd”. Eighty-four percent (102mi²) of the herd’s range is public land (94mi² U.S. Forest Service (USFS) and 8mi² DNRC). Within the occupied area are three smaller areas totaling 34 mi² (28% of occupied range) of lower-elevation, relatively steep, often rocky habitat that sheep favor year-round and concentrate on in winter. Sheep have occasionally been seen outside the “normal” range described above, most notably on Deer Mountain east of Darby.

There are two major areas of winter range. The Sula Peak portion includes the southwest-facing slopes from Sula Peak to Robbins Gulch, with most sheep found from Sula Peak to just north of Spring Gulch. After the rut, there is some tendency for mature ram groups to be

Table 3.
Summary
of potential
ram harvest
under different
population
scenarios.

MOUNTAIN-FOOTHILLS	Number of Ram Licenses	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of rams Class III & IV
Standard Regulation	Up to 20% of Class III & IV rams	96-144	>30	≥ 30
Restrictive Regulation	Up to 10% of Class III & IV rams	<96	< 30	< 30
Liberal Regulation	More than 20 % of Class III & IV rams	>144	> 80	≥ 30

found north of Spring Gulch while ewe and lamb groups are south. The Bunch Gulch winter range includes the area from the open slopes west of Bunch Gulch to those east of Jennings Camp Creek. Following the rut here, groups of mature rams, often 40 to 50 together, gravitate to the open south-facing ridges from Guide Creek to east of Jennings Camp Creek. Ewe and

lamb groups are generally found east of Guide Creek.

Most of the ewes and lambs and some smaller rams remain on or near their winter range for the rest of the year. Most of the mature rams, however, migrate to the area around Fish, Faith, Hope, and Charity Lakes in summer and wander as far northwest from there as the Rooster Comb.

The quality and quantity of winter range forage is good due to a 2000 forest fire that burned much of the area. Weeds, especially spotted knapweed, are widespread, and conifer encroachment is occurring on those areas not affected by fire.

Public Access: Access via Forest Service roads to the majority of the hunting district is very good. The area occupied by bighorn sheep within this hunting district is also very popular for hunting other wildlife species, most notably elk, but also deer, mountain lions, bears, and upland birds.

Bighorn Sheep Populations: The East Fork herd was reintroduced into historical bighorn habitat on January 20, 1972, with 19 sheep released into Tolan Creek and an additional 16 released in Bunch Gulch on March 3, for a total release of 35.

Population data for the years 1980 to 1993 found in FWP annual progress reports is often confusing, with different numbers sometimes being presented for the same year and season. In reconstructing the population history presented in Figure 1 and Table 1, where numbers did not agree, the greater of the two for a given year was used. From the original reintroduction of 35 sheep, the population currently stands at around 200 to 250.

During good years, recruitment may be 40 to 50 lambs: 100 ewes seen during spring surveys, but lamb: ewe ratios have often been below 35:100. The number of rams seen during surveys has varied widely suggesting that sightability of rams, particularly adult ram groups, can be low and is unreliable in these habitats.

Over the years, the East Fork herd has been periodically reduced by trapping sheep for transplant or research. Records for trapping episodes before 2002 are not readily available, but since then some 77 sheep have been removed (Table 3). During the 2002 effort, one ewe tested positive for *Brucella ovis*, a brucellosis bacterium affecting sheep. However, it was later determined to be a false positive. The 15 sheep trapped on February 26, 2004, were sent to the USDA National Wildlife Research Center in Fort Collins, Colorado, for research on *B. ovis*. One of these sheep died shortly after arriving there, most likely from shipping stress.

Contagious ecthyma, or sore mouth, has been found in the East Fork herd. Scabs were noted on one adult ewe during both the 2002 and 2004 trapping operations. In 2002, the ewe was released, but the one captured in 2004 was euthanized. All 14 of the surviving sheep sent to Fort Collins in 2004 eventually manifested the disease. It is unknown how many of these were infected before capture.

Recreation Provided: This population is a popular watchable wildlife opportunity enjoyed by hundreds of people because it is close to Hamilton and the sheep are often seen along U.S. Highway 93, a busy highway connecting Missoula, Montana and Salmon, Idaho. Hunting is also a popular recreational

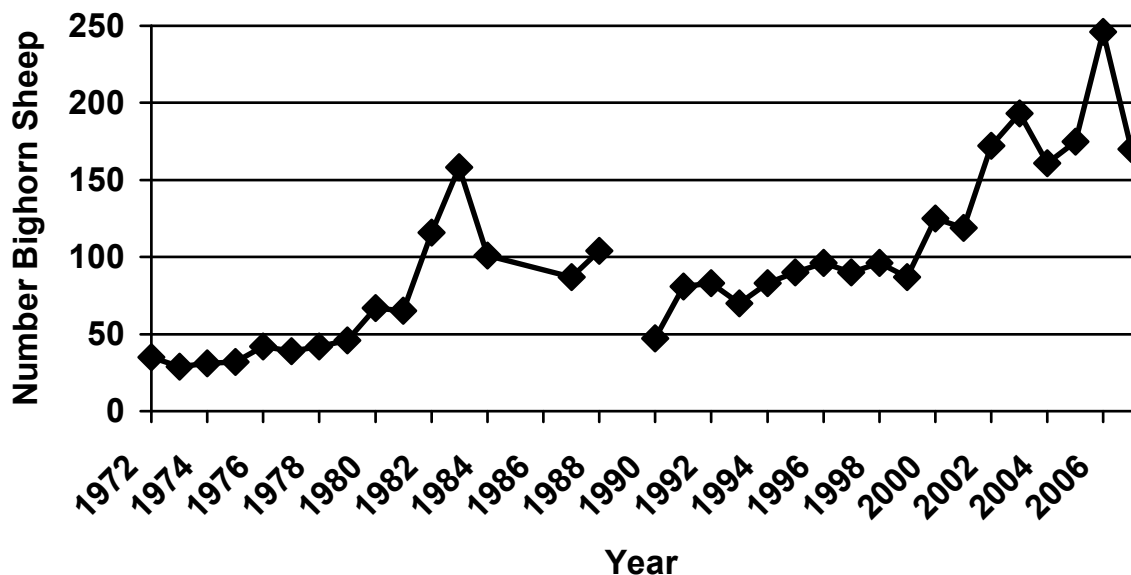


Figure 1. Total number of bighorn sheep observed during aerial trend surveys in the East Fork Bitterroot population, Hunting District 270, 1972-2007.

Table 1.
Spring
counts and
classifications
in the East
Fork Bitterroot
population,
Hunting District
270, 1972-2001.

Year	Total	Ewes	Lambs	Rams			Uncl	Per 100 ewes	
				<½ Curl	>½ Curl	Total		Lambs	Rams
1972	35 ¹	20	7			8		35	40
1973	29						29		
1974	31	9	2			9	11	22	100
1975	32	19	3			10		16	53
1976	42	21	6			15		29	71
1977	39	21	7			11		33	52
1978	42					10	32		
1979	46					13	33		
1980	67	29	20	10	8	18		69	62
1981	65	33	11	3	13	16	5	33	48
1982	116	71	25	11	9	20		35	28
1983	158	91	39	10	18	28		43	31
1984	101	41	17	15	28	43		41	105
1985	77	43	6	8	20	28		14	65
1986	129	70	29	4	26	30		41	43
1987	87	26	9	29	10	39	13	35	150
1988	104	62	14	18	10	28		23	45
1989									
1990	47	38	0	7	2	9		0	24
1991	81	57	10	8	6	14		18	25
1992	83	57	10			16		18	28
1993	70	44	2	6	18	24		5	55
1994	83	45	19	7	12	19		42	42
1995	126	73	28	13	12	25		38	34
1996	96	59	13	9	15	24		22	41
1997	90	48	20	13	9	22		42	49
1998	96	58	20	10	8	18		34	31
1999	87	52	19	3	13	16		37	31
2000	125	85	21	6	13	19		25	22
2001	119	66	22	15	16	31		33	47

¹Original reintroduction release

Table 2.
Spring
helicopter
counts and
classifications
in the East Fork
population,
Hunting District
270, 2002-2007.

Date	Total	Ewes	Lambs	Rams							Tot	Uncl	Per 100 ewes	
				Ylg	I	II	III	IV	Uncl				Lambs	Rams
18 Apr 2002	172	85	22		7	25	18	15	0	65	0	0	26	76
16 Apr 2003	193	109	22	5	5	9	24	19	0	62	0	0	20	57
17 Apr 2004	161	75	30		2	11	23	19	2	57	0	0	40	76
21 Mar 2005	175	73	34		15	13	19	15	6	68	0	0	47	93
30 Mar 2006	246	110	38	9	13	21	22	24	0	58	9	9	35	81
2 Apr 2007	170	57	18		20	27	22	16	6	91	4	4	32	160

			Lambs			Rams	
Date	Total	Ewes	Male	Female		Yearling	Adult
Feb. 13&14, 2002	37	28	3	3		2	1
Feb. 26, 2004	15	10	2	2		1	0
Jan. 28, 2007	25	25	0	0		0	0

Table 3.
Bighorn sheep
captured and
moved from
the East Fork
population,
2002–2007.

pursuit enjoyed by the lucky people who draw a bighorn license. In recent years, there have been between 73 and 143 hunter days per year associated with the East Fork herd.

Current Annual Bighorn Sheep Harvest:

Hunting was first allowed in 1976 with three legal-ram permits being issued. In recent years there have been 6 to 8 either-sex and 10 to 20 adult ewe licenses issued. Success rates are often 100% or very close to it.

Accomplishments: This population of bighorn sheep is well established in all suitable habitats in the hunting district.

Management Challenges:

- 1) Maintain separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. Two large domestic sheep producers are about 15 miles north of this bighorn range. Additionally, there are a number of hobby producers of domestic sheep in the Bitterroot Valley including one within bighorn range in Whiskey Gulch. Although not employed in the Bitterroot Valley yet, the increasing use of domestic sheep to manage weeds, colloquially known as the “sheep on wheels” program, is of concern to bighorn managers.
- 2) Loss of bighorn habitat to development does happen in this hunting district, but is minimized somewhat because of the amount of national forest land. However, some lower-elevation sheep ranges along the East Fork of the Bitterroot are seeing an increase in houses. Road-kills along the East Fork Highway and U.S. Highway 93 number about four to eight annually.
- 3) Weeds are a ubiquitous problem, and conifer encroachment is occurring in some areas of bighorn range.

Population Monitoring: This bighorn population is surveyed on winter range from a helicopter during spring green-up in April.

Bighorns are counted and classified by age and sex. Rams are classified based on horn development as yearling or Class I, II, III, or IV (Geist 1971).

Summary of Public Comment

Public comments related to the bighorn sheep population and its management in this hunting district indicates a high level of support for FWP’s management direction. Both hunters and non-hunters enjoy seeing bighorn sheep in this area.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams. There may be some opportunity for an increase in sheep numbers. Cooperate with public land management agencies and private individuals in the management of bighorn habitats. Maintain good opportunity for bighorn sheep hunters to harvest sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain about 121mi² (77,440 acres) of occupied bighorn sheep habitat for the benefit of bighorns, other wildlife species, and other agency-mandated uses.
- 2) Encourage improvement of habitat conditions, particularly weed management, on publicly owned winter ranges (primarily USFS) so that vegetation conditions on these ranges provide adequate forage for bighorns and other wildlife during the winter.
- 3) Encourage maintenance and improvement of habitat conditions on public lands (USFS) so that bighorns continue to utilize these lands during summer and fall rather than moving onto private land. Prevent over-utilization of forage by limiting the population, when necessary, through public hunting and capture and removal of sheep.

Habitat Management Strategies

- 1) Cooperate with the USFS on prescribed burning and weed treatment projects to make sheep habitats more productive.
- 2) Where identified as necessary, work with the USFS to limit motorized use, particularly off-trail OHVs and motorcycles, in the area to minimize displacement of sheep from preferred habitats and to limit the spread of weeds.
- 3) Continue to work with private landowners and Ravalli County to limit the use of domestic sheep and goats in the area.
- 4) Continue to work with private landowners, Ravalli County, particularly the Ravalli County Open Lands Board, and organizations like the Foundation for North American Wild Sheep, the Rocky Mountain Elk Foundation, Safari Club International, the Ravalli County Fish & Wildlife Association, and others to conserve important bighorn habitat on private lands through the use of conservation easements or fee title acquisition.

Game Damage Strategies

At present there are few game damage complaints related to bighorn sheep in this hunting district. If game damage problems develop, they will be addressed on a case-by-case basis consistent with Montana FWP's Game Damage Program. If it is determined that a population reduction is necessary, it could be accomplished through hunting and sheep capture for transplanting.

Access Strategies

Maintain the current level of public access on public lands. However, to maintain habitat security and protect habitat, FWP should work with the USFS and DNRC to limit use of OHVs and motorcycles where necessary. Of particular concern in this regard is the summer range used by rams in the "Chain of Lakes" area near Faith, Hope, and Charity Lakes.

Population Objectives

When considering the following population objectives, it must be kept in mind that the observability of these sheep, particularly the adult ram groups, varies considerably. Consequently, much must be left to the discretion of the managing biologist as to whether he/she has made a "good" count on any particular flight.

- 1) Maintain the number of bighorn sheep observed during "good" post-winter aerial surveys within 20% of 200 sheep (160 to 240).
2. Maintain a ram: 100 ewe ratio observed during "good" post-season aerial surveys of at least 60 rams: 100 ewes with at least 40% of the rams as Class III and IV (approximately $\frac{3}{4}$ -curl or greater).

Population Management Strategies

The population objective of 200 ($\pm 20\%$) observed bighorn sheep is largely based on: 1) the ability of public and private lands to provide habitat for wintering bighorns, 2) vehicular/bighorn collisions on the East Fork Highway and U.S. Highway 93, and particularly, 3) the understanding that catastrophic disease-caused die-offs are often density dependent occurrences.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through limited-entry harvest of ewes. The following prescriptions are recommended guidance provided no other extenuating circumstances arise, such as gross habitat changes, disease outbreak, or a groundswell of public sentiment or change in department direction. In general, bighorn sheep licenses in Hunting District 270 are issued under the following prescriptions (Table 4):

Standard Regulation: A limited number of adult ewe licenses issued would be up to 20% of the number of ewes going into the fall season. A suggested model to determine the number of ewes going into the fall season would be the number of ewes observed during the annual survey, assuming a 5% mortality of adults, and add a recruitment of one-half the previous year's lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is between 160 and 240 and lamb recruitment is above 35 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is less than 160 and lamb recruitment is less than 30 lambs: 100 ewes.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the annual survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 240 and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex or legal ram licenses with the number of either-sex licenses issued being up to 20% of the Class III and IV rams in the population (approximately ¾-curl and greater).

The Standard Regulation will be recommended if: The population is within objective (+ 20% of 200), there are more than 30 rams: 100 ewes, and 30% of the rams are Class III and IV (Table 5).

Restrictive Regulation: Limited-entry either-sex or legal ram licenses with the number issued being up to 10% of the Class III and IV rams in the population.

The Restrictive Regulation will be recommended if: The population is more than 20% below the population objective of 200, there are less than 30 rams: 100 ewes, less than 30 lambs: 100 ewes; and less than 30% of the rams are Class III and IV.

Liberal Regulation: Limited-entry either-sex or legal ram licenses with the number of licenses issued being more than 20% of the Class III and IV rams in the population.

The Liberal Regulation will be recommended if: The population is more than 20% above the objective of 200, there are more than 80 rams: 100 ewes, and more than 30% of the rams are Class III and IV.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	160-240	Above 30	Limited Entry Adult Ewes	Up to 20% of Ewes
Restrictive Regulation	<160	Less than 30	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	>240	> 40	Limited Entry Ewes OR translocate if > 25 sheep including rams are available	More than 20% of Ewes

Table 4. Summary of regulation types under different population criteria for ewe harvest and population management.

MOUNTAIN-FOOTHILLS	Number of Ram Licenses	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of rams Class III & IV
Standard Regulation	Up to 20% of Class III & IV rams	160-240	>30	≥ 30
Restrictive Regulation	Up to 10% of Class III & IV rams	<160	< 30	< 30
Liberal Regulation	More than 20 % of Class III & IV rams	>240	> 80	≥ 30

Table 5. Summary of potential ram harvest under different population scenarios.

LOWER BLACKFOOT

(Bonner)

(Hunting District 283)



Description: The Lower Blackfoot (Hunting District 283) lies directly northeast of Missoula and contains approximately 360mi². Plum Creek Timber Company (PCT) owns approximately 24%, the U.S. Forest Service (USFS) – Lolo National Forest (NF) administers about 37%, and the State of Montana administers 5% of the hunting district. The remaining is privately owned. The quality and quantity of winter range forage here is declining. Grasslands are subject to weed infestations and conifer encroachment. Shrubfields, created by the wildfires in the early 1900s, are decadent and degraded by conifer reproduction.

Approximately 25mi² (7%) of the hunting district are occupied by bighorn sheep during some portion of the year. Forty-five percent of the occupied range is on public lands. Sheep commonly graze in residential lots in the West Riverside community. The bighorn sheep population is commonly referred to as the “Bonner herd” because it is generally limited to suitable habitats in the lower Blackfoot River drainage near the town of Bonner.

Public Access: Access is very limited to the majority of the unit. Private acquisition and development of private lands at lower elevations

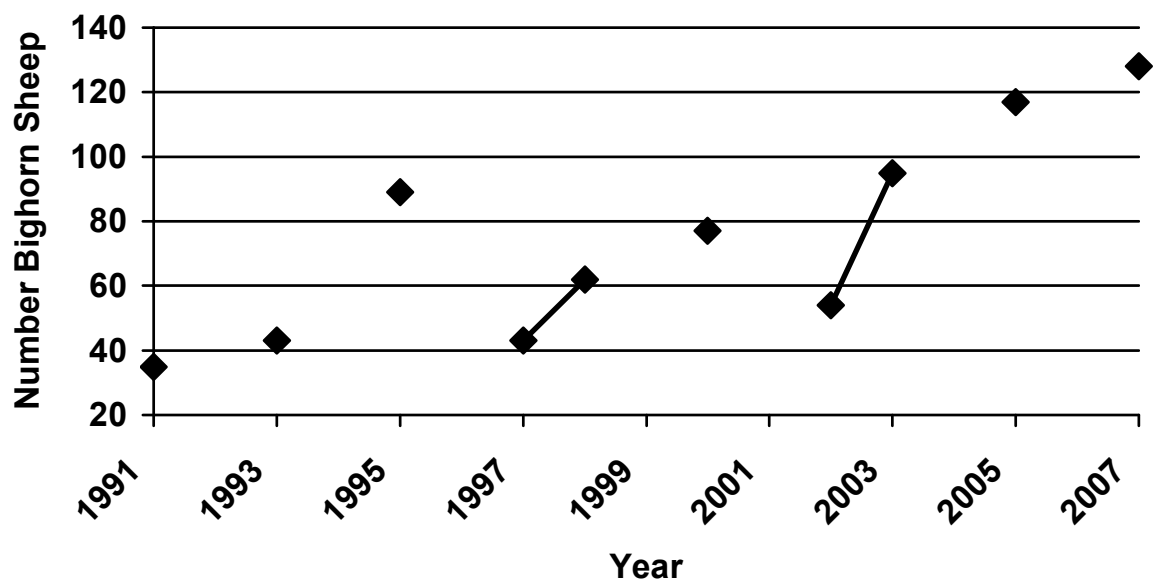
and road closures on PCT lands during the last 15 years have greatly reduced public access. Most hunting is accomplished through walking in at a few access points.

Bighorn Sheep Populations: FWP established this population by initially releasing 14 bighorns from Upper Rock Creek in 1987 on Woody Mountain. Another 30 sheep from the Sun River were released in 1990. The first helicopter survey was conducted in 1991, when 35 sheep were counted. The number of bighorn sheep counted during helicopter surveys in Hunting District 283 has ranged from 35 (1991) to 128 (2007) (Figure 1 and Table 1).

During good years, recruitment may be 40 to 55 lambs: 100 ewes recorded during early April surveys. But lamb: ewe ratios have often been below 35:100 and in 1998, following the 1996-97 winter, only 13 lambs: 100 ewes were observed. The number of observed rams has ranged between 4% and 61% of the number of ewes seen during surveys. From year to year, a great amount of variation occurs in numbers of adult rams (>3/4-curl) seen during helicopter surveys, suggesting that sightability of adult rams in particular is low and unreliable in these habitats.

Because of the lack of hunting access that might otherwise control this population and because of the numerous complaints from residents in West Riverside, FWP repeatedly has trapped and removed sheep for starting or augmenting other herds. The 1996 to 97 winter was so severe that more than 30 sheep were forced to temporarily live in the Big Pine Trailer Court until FWP trapped and successfully translocated 31 of them to the Elkhorn Mountains. In 2007, another 27 sheep were captured and moved to Utah.

Figure 1.
Total number of bighorn sheep observed during aerial trend surveys in the Lower Blackfoot population, Hunting District 283, 1991-2007.



Year	Ewes	Lambs	Yrlg Rams	Subad Rams	Adult Rams	Unclass	Total
1991	18	6	4	4	3	0	35
1993	27	6	2	5	3	0	43
1995	47	23	8	4	7	0	89
1997	27	9	2	3	2	0	43
1998	48	6	2	3	3	0	62
2000	46	15	6	5	5	0	77
2002	37	13	4	0	0	0	54
2003	49	24	12	2	8	0	95
2005	52	26	7	11	21	0	117
2007 ¹	76	41	7	3	1	0	128

Table 1.
Spring helicopter surveys in Lower Blackfoot population in Hunting District 283, Spring 1991-2007.

2007 Survey followed capture and removal of 27 sheep in January 2007.

Recreation Provided: Hunting of bighorn sheep was initiated in the fall of 1996 with the issuance of two either-sex and five adult ewe licenses. Following the 1996-97 winter, licenses were reduced to allow for population recovery. As the population increased, the number of licenses was increased. This population is a popular watchable wildlife opportunity because of its proximity to Missoula and Bonner and MT Highway 200.

Current Annual Bighorn Sheep Harvest:

Since the initial 1996 season, permitted harvests have generally risen and fallen in response to changing numbers of sheep (Table 2). Since 1996, permitted harvests have been prescribed to maintain a population of about 100 bighorns counted during spring surveys. Out of consideration for homeowners, season dates were short (September 15 through October 31) from 1996 through 2001. However, the low success rates prompted FWP to extend the season in 2002. In spite of limited access, hunter success is nearly 100% during most years. Hunters typically harvest one or more Boone and Crockett-size rams each year.

Accomplishments: This population of bighorn sheep is well established in all suitable habitats. In addition to the core population that inhabits the area north of Bonner and the Blackfoot River, a subpopulation of approximately 30 (not surveyed) occupies a portion of the Rattlesnake Wilderness and National Recreation Area. Another subpopulation of approximately 30 (not surveyed and not hunted) occupies the area south of the Blackfoot River between Bonner and LaFrey Creek in Hunting District 292. During cold winters, sheep often cross an iced-over Blackfoot River, which separates Hunting District 283 from Hunting District 292. Occasionally, bands of young rams and/or ewes are seen on Mount Jumbo and near Johnsrud Park in Missoula, suggesting that surplus animals are immigrating in search of new habitats or other bighorn populations.

In 2008 and 2009, TNC purchased 12,305 acres within the hunting district from PCT as part of the Montana Legacy Project. In 2009, TNC turned 5,169 acres over to the Lolo NF. The majority of those lands include important occupied bighorn sheep winter habitat northeast of Bonner.

Year	Number Either-Sex Licenses	Ram Harvest	Number Ewe Licenses	Ewe Harvest
1996	2	2	5	4
1997	1	1	2	1
1998	1	1	2	1
1999	1	0	2	0
2000	1	0	2	2
2001	1	1	2	2
2002	1	1	2	2
2003	1	1	4	4
2004	1	1	4	4
2005	3	3	5	5
2006	3	3	5	5
2007	5	(5)	10	(10)

Table 2.
Number and types of licenses issued and subsequent harvest, Hunting District 283, 1996-2007.

Management Challenges:

- 1) Maintaining separation of wild sheep and domestic sheep and goats to avoid transmission of disease to bighorns. Rural subdivisions in the East Missoula and Bonner areas have resulted in small bands of livestock including domestic sheep and goats. In 2000, Missoula's decision to manage weeds with domestic sheep grazing led to protocols for reporting bighorn sheep on Mount Jumbo by domestic sheepherders. To date, two yearling bighorn rams have been shot and removed from Mount Jumbo. Also, Missoula County has adopted covenants prohibiting domestic sheep in two subdivisions, but enforcement is typically left to homeowners.
- 2) Loss of wildlife habitat is occurring in this hunting district; human development on winter range areas and along migratory routes is common. Salting for bighorns is common and leads to degradation of nearby forage plants and potentially increases the risk of disease transmission. Road-kills on MT Highway 200 number five to 10 annually.
- 3) Weed infestations and conifer encroachment are degrading forage production on summer and winter ranges.
- 4) PCT's sales of parcels have reduced hunter access to important sheep habitats. Additional land sales and subsequent rural developments in the Gold Creek area are expected to further diminish public access.
- 5) Damage complaints from homeowners in the West Riverside area are chronic occurrences. In addition to depredation of gardens and ornamental plants, residents often voice fears of possibly being injured by wild sheep.

Population Monitoring: This bighorn population is surveyed biennially from a helicopter. Surveys are conducted in April, during spring green-up. Typically, only the winter/spring range from Mitauer Creek to Wishard Ridge is surveyed. Bighorns are counted and classified by age and sex. Based on horn development, rams are assigned to yearling, sub-adult (1/2- to 3/4-curl) or adult (3/4+ curl) classifications. To monitor trends in lungworm loads in this population, pellet groups are collected in several locations every few years and sent to the Veterinary Research

Laboratory at Montana State University in Bozeman.

Summary of Public Comment

Public comments related to the bighorn sheep population and its management in this hunting district indicates a high level of support for the current season structure. Both hunters and non-hunters enjoyed seeing bighorn sheep in this area.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams at current numbers. Cooperate with public land management agencies and private individuals in the management of bighorn habitats. Maintain good opportunity for bighorn sheep hunters to harvest sheep.

Habitat Objectives

- 1) Develop cooperative programs that encourage public and private land managers to maintain approximately 20,000 acres of occupied bighorn sheep habitat for the benefit of bighorns, other wildlife species, and other agency-mandated uses.
- 2) Encourage improvement of habitat conditions on publicly owned winter ranges (primarily USFS) so that vegetation conditions on these ranges provide adequate forage for bighorns and other wildlife during the winter.
- 3) Encourage maintenance and improvement of habitat conditions on public lands (USFS) so that bighorns continue to utilize these lands during summer and fall rather than moving onto private lands.
- 4) Prevent over-utilization of forage by limiting the population to less than 110 through public hunting and capture and removal of sheep.

Habitat Management Strategies

1. Continue to cooperate with the USFS on prescribed burning and weed treatment projects to make sheep habitats more productive.
2. Work with the USFS to limit motorized use and access of the area to minimize displacement of sheep from preferred

habitats and to limit weed infestations on the range.

3. Continue to work with private landowners and Missoula County to limit the use of domestic sheep and goats in the area.

Game Damage Strategies

Damage complaints from West Riverside residents are chronic. Public hunting to limit this population has not been efficacious and may be less so in the future. Bighorn numbers, however, can be managed through a combination of hunting and trapping and removal as they approach or exceed objectives.

Access Strategies

Lack of hunter access is a significant issue. FWP must continue to work with PCT and Stimson Lumber Co. to protect access to public lands.

Population Objectives

- 1) Maintain the number of bighorn sheep observed during post-winter aerial surveys within 10% of 100 sheep (90 to 110).
- 2) Maintain a ram: 100 ewe ratio observed during post-season aerial surveys of at least 60 rams: 100 ewes with at least 30% of the rams having a ¾-curl.

Population Management Strategies

Bighorn numbers are currently being managed through hunter harvests of ewes and rams and through capture and removal projects. The population objective of 100 ($\pm 10\%$) observed bighorn sheep was derived by considering: 1) the ability of public and private lands to provide

forage for the wintering bighorn population, 2) conflicts with residential developments, 3) vehicular/bighorn collisions, and 4) the understanding that catastrophic disease-caused die-offs, exhibited in many other sheep populations, are often density dependent occurrences.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed through limited-entry harvest of the female segment. In Hunting District 283, licenses are issued under the following prescriptions (Table 3):

Standard Regulation: A limited number of adult ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the biennial survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs.

The Standard Regulation will be recommended if: The total number of bighorns counted on the survey area is within 10% of the population objective and lamb recruitment is above 35 lambs: 100 ewes.

Restrictive Regulation: Fewer than five ewe licenses would be prescribed.

The Restrictive Regulation will be recommended if: The total number of bighorns counted on the survey area is more than 10% below the population objective and lamb recruitment is less than 35 lambs: 100 ewes.

MOUNTAIN-FOOTHILLS	No. Bighorns Counted on Survey Area	Recruitment Lambs: 100 Ewes	Regulation Types	Harvest Rates
Standard Regulation	$\pm 10\%$ of 100	Above 35	Limited Entry Adult Ewes	Up to 20% of Ewes
Restrictive Regulation	More than 10% below 100	Less than 35	Fewer than 5 ewe licenses	Less than 10% of ewes
Liberal Regulation	Greater than 10% above 100	Greater than 40	Limited Entry Ewes OR translocate if > 25 sheep including rams are available	More than 20% of Ewes

Table 3. Summary of regulation types under different population criteria for ewe harvest and population management.

Liberal Regulation: Limited ewe licenses valid in the entire hunting district during the general season for bighorn sheep in this district. The number of ewe licenses issued would be up to 20% of the number of ewes going into the fall season. The number of ewes going into the fall season would be based on the number of ewes observed during the biennial survey, assuming 5% mortality of adults, and adding recruitment of one-half the previous year's lambs,

OR if the number of ewes and rams is at least 25 sheep (minimum transplant number) above objective, the surplus could be used for transplanting.

The Liberal Regulation will be recommended if: The total number of bighorns counted on the survey area is greater than 10% above the population objective and lamb recruitment is greater than 40 lambs: 100 ewes.

Rams:

Standard Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being up to 20% of the $\frac{3}{4}$ -curl rams in the population.

The Standard Regulation will be recommended if: The population is within objective (+ 10% of 100), there are more than 30 rams: 100 ewes, and 30% of the rams are at least $\frac{3}{4}$ -curl (Table 4).

Restrictive Regulation: Limited-entry either-sex licenses with the number issued being up to 10% of the $\frac{3}{4}$ -curl rams in the population.

The Restrictive Regulation will be recommended if: The population is more than 10% below the population objective of 100, there are less than 30 rams: 100 ewes and less than 40 lambs: 100 ewes, and less than 30% of the rams are at least $\frac{3}{4}$ -curl.

Liberal Regulation: Limited-entry either-sex licenses with the number of either-sex licenses issued being more than 20% of the $\frac{3}{4}$ -curl rams in the population.

The Liberal Regulation will be recommended if: The population is more than 10% above the objective of 100, there are more than 100 rams: 100 ewes, and more than 30% of the rams are at least $\frac{3}{4}$ -curl.

GALLATIN – YELLOWSTONE, SOUTH ABSAROKA, HYALITE, SOUTH YELLOWSTONE

(Upper Yellowstone Complex)
(Hunting Districts 300, 303, 304, 305 and Mill Creek Non-Hunted Population)



Description: The Upper Yellowstone sheep management complex (Hunting Districts 300, 303, 304, and 305 and the Mill Creek non-hunted sheep population) is located in the Southern Mountains ecological region and contains approximately 1,350mi² in the Upper Yellowstone and Upper Gallatin River drainages north of Yellowstone National Park (YNP). This sheep population is comprised of several small, interconnected subpopulations, some of which occupy additional habitat inside YNP. Sheep movements across national park and state boundaries impact sheep management decisions, hunting regulations, and survey strategies (see below).

Bighorn sheep currently occupy less than 10% of this large area. Sheep habitat in the Upper Yellowstone drainage is a mosaic of foothills grassland, forest, alpine ridges and basins, and rugged rocky canyons and cliffs at elevations of 5,500 to 10,500 feet. Because most sheep in this complex occur in small, scattered

Table 4.
Summary
of potential
ram harvest
under different
population
parameters and
criteria.

MOUNTAIN-FOOTHILLS	Number of Either-Sex or Legal Ram Licenses Is	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of Rams with $\geq \frac{3}{4}$ -curl
Standard Regulation	Up to 20% of the $\frac{3}{4}$ -curl rams	$\pm 10\%$ of 100	>30	≥ 30
Restrictive Regulation	Up to 10% of the $\frac{3}{4}$ -curl rams	More than 10% below 100	< 30	< 30
Liberal Regulation	Up to 20 % of the $\frac{3}{4}$ -curl rams	Greater than 10% above 100	> 100	≥ 30